

A 200-PDR. BREACHING BATTERY AT FORT SUMTER IN THE CIVIL WAR

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THE COAST ARTILLERY JOURNAL

Volume 67

DECEMBER, 1927

Number 6

Annual Report of the Chief of Coast Artillery

1. GENERAL.

a. The fiscal year ending June 30, 1927, has been marked by general cordiality in the relations of the Coast Artillery with other branches, both in the discussions and conferences within the War Department on matters of common interest and in the field where joint action has been possible. This office has received many valuable suggestions from representatives of other branches as to training regulations and defense plans, and has, at times and with advantage, carried the system of concurrences beyond the requirements of the War Department.

b. During the fiscal year reported upon the undersigned has inspected Coast Artillery troops and installations in the Harbor Defenses of Cristobal, Amador, Honolulu, Pearl Harbor, San Francisco, Los Angeles, San Diego, The Columbia, and Puget Sound. Incident to these inspections, and for the purpose of discussing defense and training plans as affecting Coast Artillery, visits have been made to the Headquarters Panama Canal Department and the Panama Coast Artillery District, to the Headquarters Hawaiian Department and the Hawaiian Coast Artillery District, and to the Headquarters IX Corps Area and the Ninth Coast Artillery District. In addition, inspections have been made of the 63d Coast Artillery (AA), the 64th Coast Artillery (AA), and the 65th Coast Artillery (AA). The 61st Coast Artillery (AA) has been observed during its work in connection with the tests of antiaircraft materiel at Aberdeen Proving Ground and the 62d Coast Artillery (AA) during tactical exercises on Long Island. The Coast Artillery School also has been inspected and opportunity taken to visit the Coast Artillery installations and units at Forts Monroe and Eustis. In all 2 months 19 days have been spent on inspection duty and 46% of the organizations of the arm inspected or observed.

c. Coast Artillery organizations serve under conditions markedly differing in character. While all are at reduced strength, the garrisons of our overseas possessions are maintained at a much higher percent-

age of the manning table and are free to devote their time to their own administrative, planning, and training problems. Both in the Panama Canal and the Hawaiian Departments I found that conditions as to materiel, training, and morale compare favorably with those that obtained in our most efficient Coast Artillery posts of pre-war days, with the added asset of a broader appreciation of the Coast Artillery's part in the combat team.

d. Within the continental United States, even at the more active stations, the available personnel permits only a small fraction of the armament of harbor defenses to be manned and the units assigned batteries are at a lesser strength than in our overseas possessions. Many harbor defenses are on a caretaker status. Practically all active units devote a large part of the outdoor season to the preparations for, and the conduct of, training camps for other components of the Army. In general, it may be said that the response to these demands is met with high spirit, but it cannot be denied that this varies with the temperament of the higher commanders. Where these are optimistic, are filled with interest in their work, are determined to do the best with the means at hand, arrange the work so that each unit in turn has the maximum personnel for certain periods and then assumes the full burden of "house-keeping" duties at others, encourage the personnel by their presence especially at the most onerous tasks, and discourage fault finding at the frequent and unavoidable calls upon units for unexpected detachments to aid in duties necessary but not related to the special problems of their own commands, the results are all that can be asked. It is believed this spirit among our officers is becoming more general. It is believed there is a growing recognition of the fact that one of the principal training obligations of our personnel in the United States is to prepare for mobilization and that the very difficulties of carrying on with the small garrisons and the constant turn-over of personnel tends to promote that flexibility of mind necessary for the many adjustments that must be made during expansion in war. A few years ago this office received many letters indicating a sense of discouragement due to the many demands and the lack of means; protests against detachments and requests for additional personnel were common. While requests for personnel continue, there is a marked change in the general tone of the letters received; there are many evidences of pride of accomplishment under difficulties. One of the most gratifying features of the inspections was the condition of materiel in harbor defenses on a caretaker status.

Futhermore, it is evident that officers are able to visualize more fully the general training activities of the Army, are beginning to see

that a camp of instruction at some distant point is just as important as a camp at their own station. This was evidenced by the action of one regimental commander in recommending that a detachment from his command to an interior training camp be increased, as he did not feel the small detachment ordered would be able to give a balanced training.

e. While on the Pacific Coast and in crossing the continent I had opportunity to inspect several R. O. T. C. units, to visit some National Guard Units, and to attend assemblies of the Organized Reserves. There is no doubt that the efforts of the Regular officers since the passage of the National Defense Act are bearing fruit. I consider the R. O. T. C. one of our most important activities and one that has opened to our officers a broad and interesting field of usefulness. I was glad to find the heads of our universities and their closest advisors satisfied with the military personnel and appreciative of the importance and value of the work being done.

f. There has been no change in the missions of the Coast Artillery Corps during the preceding year, except that sound ranging for fire control of artillery engaging land targets, the development and use of which was formerly charged to the Coast Artillery alone, has been made a joint responsibility of the Coast and Field Artilleries.

2. PERSONNEL.

a. Distribution of Officers, May 31, 1927. (May 31st selected since June 30th falls within a period of change and would not give a true picture of the normal distribution).

	Maj. Gen.	Col.	Lt. Col.	Maj.	Capt.	1st Lt.	2nd Lt.	Total	Author- ized
With Troops in United States		(14)	(12)	(29)	(104)	(79)	(61)	(299)	(308)
H. D. (Including Disls.)		11	10	19	69	56	42	207	207
A. A. Arty.		1	1	5	22	14	11	54	54
Hq. 30th C. A. Brig.		1		1	1			3	3
Ry. Arty.		1		3	6	4	4	18	24
T. D. Arty.			1	1	5	4	3	14	17
1st Sound Ranging Battery					1	1	1	3	3
With Troops on Foreign Ser.		(11)	(5)	(45)	(75)	(69)	(89)	(294)	(280)
Panama		3	2	13	17	13	23	71	70
Hawaii		5		18	26	19	36	104	107
Manila		3	3	14	32	37	30	119	103
Other Branch Duty	(1)	(4)	(4)	(48)	(33)	(38)		(128)	(127)
Sub. Mine Dep. & C. A. Board		1		4	1			6	7
O. C. C. A.	1	2	3	5	1			12	10
Special Service Schools		1	1	39	31	38		110	110
Detached Duty		(28)	(39)	(103)	(59)	(50)	(6)	(285)	(292)
General Service Schools		1	1	35	5			42	
R. O. T. C.		4	2	17	19	10		52	
National Guard		2	3	13	13	4		35	
Organized Reserves		13	18	17	7	5		60	
U. S. M. A.				4	3	14		21	
Inland Waterways Corp.		1						1	
I. G. D.		2	2	2				6	
Miscellaneous Details		5	13	15	12	17	6	68	
Total	1	57	60	225	271	236	156	1006	1007

b. Distribution of Enlisted Men.

	U. S.	Panama	Hawaii	Philippines		At Sea	Total
				American	Phil. Scouts		
Present authorized strength Letter A. G. 341.1 (3-1-27) (Based on G. O. 7, 1926)	5061	2253	3000	1200			11914
Authorized G. O. 30, 1924					2100		
Actual strength, American May 31, 1927	5621	2227	2717	1159		85	11809
Actual strength, Phil. Scouts May 31, 1927					1570		1570
Grand Total							13379

c. The following tabulation shows the progress that has been made in passing Coast Artillery officers through the service schools.

	Field Officers	Cpts.	Cpts.	1st Lts.	2nd Lts.	Total
Army War College—Graduates	66					66
Grads. C. & G. S. S.	186	7				193
Adv. Cr., C. A. S.—Graduates	191	10				201
To attend 1927-28 Course	18	12				30
†Available—next 5 years	41	128				169
B. O. Cr., C. A. S.—Graduates			172	103	1	276
To attend 1927-28 Course			20	29	3	52
*Available—next 3 years			75	104	181	360

† Includes all present majors who have not had course, 4 lieutenant colonels, and captains to be promoted to majors within next 10 years (1938).

* Includes all company officers who have not had course.

Under present policies it is expected that for the next few years the class for advanced course at the Coast Artillery School will be composed of about 25 officers and for the battery officers course of about 55.

d. There has been a sustained effort in the assignment of officers during the past four years to reduce to a minimum the number of moves required.

The success of this effort is shown in the following comparative statements.

The average time on dates indicated officers had been at their stations in the United States was as follows:

	May 31, 1926	May 31, 1927
Colonels	20 mos.	25 mos.
Lt. Colonels	24 mos.	27 mos.
Majors	19 mos.	21 mos.
Captains	20 mos.	24 mos.
1st Lts.	15 mos.	19 mos.
2nd Lts.	17 mos.	18 mos.

Another and perhaps more striking illustration of the application of this policy is shown by the following statement giving the number of officers who had been at their stations in the United States over two years on the dates indicated.

	Aug. 31, 1924	May 31, 1925	May 31, 1926	May 31, 1927
Colonels	9	9	17	21
Lt. Cols.	22	21	19	31
Majors	35	42	30	41
Captains	29	50	68	72
1st Lts.	10	17	34	37
2nd Lts.	8	6	7	19
Totals	113	145	175	221

This has been brought about by synchronizing the compulsory moves, *i. e.*, those to and from foreign service and to and from the service schools, both with each other and with other moves where normal tours of duty were expiring.

e. Distribution of Coast Artillery Reserve Officers, June 30, 1927.

Group	CORPS AREA									Pan. Dept.	Haw. Dept.	Phil. Dept.	Total
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th				
G. A.		2	1	1		1							
B. A.													
* Authorized													402
Available	16	26	59	120	13	28	6	58	5	3	2	3	339
T. A.													
** Authorized	436	487	589	243	193	94	133	33	529				2737
*** Available	519	566	573	583	184	373	416	123	456	12	21	10	

* Per A. C. 320.2 (5-26-27) Misc. (Ret.) A June 7, 1927.

** Strength is in accordance with "Procurement Objective for the Officers Reserve Corps," A. C. 320.2 (3-2-27)

Misc. N-A dated April 12, 1927, and A. C. 320.2 (4-29-27)

Misc. A dated May 6, 1927.

*** Does not include National Guard Officers holding Reserve Commission.

f. Distribution of Enlisted Specialists on June 30, 1927.

	UNITED STATES		FOREIGN GARRISONS		TOTAL	
	Authorized	Actual	Authorized	Actual	Authorized	Actual
Sergeants Major . . .	71	72	30	29	101	101
Electricians	182	180	87	89	269	269
Master Gunners . . .	31	31	13	13	44	44
Radio	31	31	19	19	50	50
TOTALS	315	314	149	150	464	464

3. TRAINING.

a. General.—The training policies of the Corps may be briefly stated as follows:

(1) The maintenance of a high state of training for harbor defense units, including the development of improved methods for determining expeditiously and accurately the deviations of all shots fired under service conditions and applying the necessary corrections.

(2) The maintenance of a high state of training for units of rail-way and tractor-drawn artillery employed for fire on naval targets,

together with the development of suitable materiel and correct methods of tactical employment.

(3) Similar action for the units of the antiaircraft service.

(4) Improvement in accuracy of sound ranging.

(5) Maximum possible assistance to Coast Artillery units of the other components.

In the development of improved methods and the test of equipment both the overseas garrisons and the garrisons of the Coast Artillery training centers in the United States (one for each Coast Artillery District) have been employed. Considering the shortage of personnel and the heavy caretaking duties, the results have been satisfactory except as specified below. The principles enunciated in G. O. 21, War Department, 1926, have been of great practical advantage in the conduct of training.

b. Gunnery and Target Practice.—(1) During the past year extensive modifications have been made in the general policies governing the conduct of target practice in the Coast Artillery Corps. Those new policies, which are found in Coast Artillery Memorandum No. 7, September 21, 1926, are based upon the fact that service artillery practice is for the purpose of teaching troops practical gunnery under war conditions as nearly as these can be simulated. A study of the results of recent years indicates that, in many cases, seacoast batteries had drifted away from the basic objective, *i. e.*, hits per gun per minute.

(2) Having in mind that some means should be devised to influence organizations to fire at greater ranges and at the maximum speed consistent with accurate adjustment of fire, and also to furnish a scale for rating practices in this office, a scoring feature has been introduced. In this score a premium has been placed upon decreasing the time element and increasing the range in hope of overcoming a tendency noted among certain organizations to fire with unnecessary deliberation, to conduct firing in phases in order to make corrections based upon the observation of previous shots, and to utilize ranges most suitable for training in adjustment of fire. Since a special ammunition allowance for adjustment problems is made it was believed the service practice allowance should be used for broader purposes.

(3) There was published this year a confidential pamphlet (C. A. M. No. 8) showing the detailed results of all Coast Artillery organizations that conducted practices during the year. By the publication of this information showing the relative standing of all organizations it is hoped to increase the interest of all concerned in the conduct of target practice. In addition to indicating in this manner the relative

accomplishments of all organizations there has been revised, through the kindness of Sons of the Revolution of the Commonwealth of Massachusetts, the Knox Trophy to be awarded annually to the battery of the Coast Artillery standing highest in gunnery.

(4) While most of our gunnery problems are satisfactorily solved there are two of great importance still awaiting either solution or practical test. The former is control of anti-aircraft machine gun fire beyond practical tracer ranges; it is hoped the devices to be tested at Aberdeen Proving Ground this year may advance us materially toward the solution of this problem. The latter—control of seacoast gun fire beyond terrestrial observation—has not been tested. . . . Various plans for control based on observation from aircraft have been suggested and studied. It is hoped that the approaching completion of the terrestrial fire control systems for some of our 16-inch batteries (this terrestrial system being necessary as a check on the practice and for safety purposes) may enable us in the near future to make a satisfactory test of the more promising methods.

(5) Another deficiency that needs correction is that of night target practice. It is expected during the coming year to hold more practices at night than in the past, especially in the foreign possessions.

[In paragraphs (6) and (7) the report discusses the results of anti-aircraft and seacoast practice. The Chief of Coast Artillery expressed himself as satisfied with the former but criticizes the slow rate of fire in the latter, 84% of our batteries having deteriorated in this respect during the year.]

(8) Prior to 1917 battle target practices were common. Since the World War practices have been limited, with but few exceptions, to battery firings. The time has now arrived when the Coast Artillery should again conduct battle practices in all localities where adequate personnel is available. This, it is proposed to do during the present year.

(9) At Fort Eustis, Virginia, the 1st Sound Ranging Battery has taken advantage of all firings of two regiments (one railway and one tractor drawn) at water targets, the battery functioning to locate the firing battery position. Several special practices were held during which the sound ranging installation measured also the deviations of the fall of shots fired at a land target. . . .

c. Tactical training.—(1) In addition to the tactical training required of all harbor defense units in the "position in readiness" period and at tactical inspections, joint Army and Navy exercises have been held in Manila and Subic Bays, in the Panama Canal Department, at

San Francisco, and in the Narragansett Bay area. The exercises on the New England coast furnished the means for testing the suitability of the present system of communication and fire control employed in our harbor defenses. It is believed that the system in general proved to be simple and efficient and stood the test of these maneuvers. The mission of the harbor defense in the tactical chain of coast defense as laid down in present training texts was found to be proper and workable. These exercises furnished a splendid experience for senior Coast Artillery officers and their staffs in connection with their wartime tactical duties and tested out existing war plans and projects. The holding of similar exercises each year, even on a reduced scale, should prove a special benefit in harbor defense commands.

(2) The 62d Coast Artillery (AA) spent one month in the field at Camp Upton, Long Island. These exercises furnished the means for testing the provisions of a proposed regulation affecting the tactical employment of all units of an antiaircraft regiment by means of the solution of a series of tactical problems covering the antiaircraft service in a corps. Many new ideas were developed among which may be mentioned:

- (a) The joint employment of searchlight and antiaircraft guns.
- (b) The method of furnishing machine gun defense against low-flying attack planes with troops on the march and in battle position.
- (c) The defense of rear area installations by guns and machine guns.
- (d) The development of the most suitable vehicles for transporting and towing antiaircraft materiel.
- (e) The proper organization and equipment for the antiaircraft intelligence service (A. A. I. S.).
- (f) Methods through which the time element in installing a defense may be reduced.

(3) There has recently been issued a regulation for joint employment of the Antiaircraft Service and the Air Corps for which there has been a great need for several years. Now that this text is in the hands of using services, joint training should be stressed wherever units of the two services can be brought in contact. This training is especially necessary for the Coast Artillery along the following lines:

- (a) The observance from the air of long range finding for coast artillery guns against naval targets.
- (b) The furnishing of information by means of heavy and lighter-than-air craft covering the movement of hostile warships in the vicinity of harbor defenses .

(c) Methods of joint action of aviation with guns, searchlights, and sound locators of the Antiaircraft Service.

(d) The furnishing of moving aerial targets for target practice by antiaircraft guns and machine guns.

(e) The furnishing of towed water targets for use in aerial bombing and the measuring of the deviation of fall of bombs from coast artillery range stations.

d. Training of other components.—(1) *Summer Camps.*—During the past year the number of summer training camps, together with the number of units of all classes of Coast Artillery undergoing instruction, has been substantially the same as the previous year. Under the present War Department policy of limiting the expenditure of funds for transportation of personnel to and from summer camps it will be necessary during the coming year to establish a few additional ones. The administration of and methods of instruction at camps has been materially improved by curtailing overhead and simplifying training directives.

(2) *Antiaircraft Training in Central Part of Country.*—Due to the lack of a suitable antiaircraft artillery unit of the Regular Army located in the central part of the country it has been necessary to resort to transporting detachments of antiaircraft troops from both coasts to act as demonstrating units and to assist at the summer camps in the detailed training of coast artillery units of the National Guard, Organized Reserves, and R. O. T. C. undergoing antiaircraft training. The absence of these detachments during the active training season has, of necessity, been detrimental to the training of commands from which they are taken and to the training of units associated with them. The movement of these detachments each summer is an item of considerable expense. In the central portion of the United States are located two National Guard and fifteen Organized Reserve regiments of antiaircraft artillery and seven R. O. T. C. units, all requiring training, which should be supervised and assisted by Regular Army personnel skilled in all phases of the antiaircraft service. Should any increment be authorized for the Corps, the organization of an antiaircraft regiment at reduced strength for this purpose would be given first priority.

(3) The training of the National Guard in battery action is progressing satisfactorily and commendable improvement is noted, especially in antiaircraft fire on moving targets. The most outstanding training difficulty is believed to be the lack of opportunity for commanders of the higher echelons to exercise their tactical functions; the system of command post exercises, recently introduced, gives promise

of meeting in part the need for higher tactical training. I desire to express appreciation of the spirit of several National Guard commands in the cordial assistance in the training of associated reserve personnel.

(4) From a survey of reports received from the field there is indicated an extremely satisfactory increase in the number of correspondence course subcourses completed by Coast Artillery officers of the Organized Reserve Corps throughout the country during the last year. This is in no small measure due to the interest displayed by the Coast Artillery District Commanders in the training of reserve personnel located within their commands. Taking into consideration the limited contact of unit executives with the reserve officers of those units that are scattered over a considerable area, the results obtained evidence a gratifying interest on the part of all concerned.

In order that junior officers may major in gunnery and materiel and senior officers in higher organizations and tactical employment, this office is undertaking, with the War Department's approval, a reorganization of certain Coast Artillery texts. This reorganization should give better balanced courses of training.

(5) The training of Coast Artillery R. O. T. C. units has shown a satisfactory progression during the year and the training directive for the academic year courses needs no revision, in my opinion, at this time. A unit was established at Fordham University, located at Fordham, N. Y., in the fall of 1926 and one will be installed at the University of Delaware in the fall of this year. These two units, when they reach a state of production, will be of considerable benefit in the supply of officer material for Coast Artillery organizations located along the Atlantic seaboard. There is need for a relocation of two or three units from the interior of the country to the vicinity of the coast line. This will leave sufficient units in the interior to furnish the officer replacements for the antiaircraft units so located.

On account of the reduction in available funds for transportation to summer camps it has been necessary to establish two new Coast Artillery R. O. T. C. camps; one at Camp Knox, Ky., and one at Fort Moultrie, S. C. The former is intended as an antiaircraft artillery camp while the latter affords training in both antiaircraft and water target gunnery. The character of training given in the summer camps is, from my observation, of a high order considering the limited amount of ammunition available for utilization in the training of officers in the adjustment of fire and teamwork in target practice. It is desired to give all R. O. T. C. students, while attending summer camps, practical training with as many types of armament as possible in order

that they may be prepared to function as battery officers with any class of Coast Artillery Reserve units.

(6) The Coast Artillery C. M. T. Camps are showing increased efficiency each year. Now that the additional year's requirements for obtaining a commission in the Organized Reserves by means of this agency are known, it has been possible to prepare a more consistent training directive for the four years' camp course. The present camp training directive of the War Department is considered satisfactory when the ammunition allowance given in War Department orders is made available by Corps Area Commanders from funds under their disposal. Any diminution in this allowance of ammunition tends to decrease materially the practical benefit of the camp. The training of basic students in large numbers at Coast Artillery camps has, to some extent, been detrimental to the training of the advanced Coast Artillery students, owing to the lack of sufficient instructors to carry out all phases of training for both the basic and advanced classes.

f. The Coast Artillery School.—In my report for last year I dealt in detail with the work accomplished at the Coast Artillery School, together with the changes that had been made in the curricula leading to balanced courses based on the needs for producing graduates both well versed in branch technique and capable of undertaking advantageously courses at the General Service Schools. During the academic year just completed the high standard of the school has been maintained.

The following tables show the number of students, both commissioned and enlisted, passing through all the Departments of the School during the past year.

OFFICERS' DIVISION

Course	Duration	Number of Officers Completing Course
Advanced	9 months	27
Advance Engineering	4½ months	3
Advanced Gunnery	4½ months	3
Battery Officers'	9 months	51
Refresher	3 months	9
Special for National Guard and Organized Reserves	8 weeks	29

ENLISTED MEN'S DIVISION

Course	Duration	Number of Enlisted Men Completing Course
Artillery	9 months	7
Engineering	9 months	19
Radio	9 months	6
Clerical	9 months	16
Special for National Guard	8 weeks	9

g. The Coast Artillery Board.—The following indicates the status of work performed by the Coast Artillery Board during the past year.

(1) Projects on hand July 1, 1926:		
(a) Referred to Board by OCCA	19	
(b) Originated by Board	10	
		29
(2) Projects received and initiated during year:		
(a) Referred to Board by OCCA	93	
(b) Originated by Board	16	
		109
	Total projects considered	138
(3) Status of Projects:		
(a) Referred to Board by OCCA —		
1. Completed	85	
2. Uncompleted	27	
		112
(b) Originated by Board—		
1. Completed	22	
2. Uncompleted	4	
		26
		138
(4) Projects on hand July 1, 1927:		
(a) Referred to Board by OCCA	27	
(b) Originated by Board	4	
		31

The Board acts as an advisory agent to the Chief of Coast Artillery. The varied character of the projects investigated and reported upon was outlined on pages 34 to 36 of my annual report for the year 1926.

h. Status of Training Regulations.—The following table shows, as of June 30, the state of production of training pamphlets pertaining to the Coast Artillery Corps:

Printed and mimeographed	44
Being written or revised	27
In the hands of The Adjutant General	3
For concurrence of other Branches	4
Total	78

The needs of revision of a considerable number of present texts is due to recent developments pertaining to gunnery, materiel, and tactical employment of the antiaircraft service, and to recently inaugurated changes in the methods of conducting artillery practice with seacoast guns.

It is my belief that training texts in the present loose-leaf form are satisfactory for peace-time training and for employment in war-time training schools under my supervision. For use in general mobiliza-

tion camps and in the field during active operations I prefer a system of training manuals of pocket size, containing essentials in condensed form.

i. Organization Tables.—During the year the series of organization tables pertaining to the Coast Artillery Corps, indicated in detail in my last report have, with few exceptions, been completed and printed. There has been placed in the hands of all harbor defense commanders in the United States a complete table of available war-time personnel (T. O. 302-W) and these commanders have prepared voucher tables showing in detail the organization of all headquarters and firing batteries of regular, national guard, and organized reserve commands.

4. MATERIEL.

* * * * *

b. Most important progress in the development of Coast Artillery materiel was secured as a result of the antiaircraft tests held at Aberdeen Proving Ground, Maryland, during August and September, 1926. Through the cordial cooperation of the Ordnance Department, the Air Corps, the Corps of Engineers, and the Signal Corps, all of the most modern types of antiaircraft armament, fire control equipment, and searchlights were assembled for combined use by trained Coast Artillery personnel against aerial targets. A large part of this materiel was still in the development stage, and, therefore, not perfect, but, under the favorable conditions resulting from coordinated effort, minor defects were promptly eliminated and much information was secured that was of great value in the redesign work undertaken in preparation for the similar tests to be held in the near future. The increase in the accuracy of fire secured with the experimental equipment was most gratifying.

c. The increased range of modern seacoast armament has necessitated a redesign of many of our fire control instruments. A long-range plotting board and a long-range depression position finder were successfully tested under the supervision of the Coast Artillery Board during the past year, and, after minor modifications now in progress have been completed, will be sent to the Hawaiian Department for assignment. Other development projects in connection with seacoast guns, referred to in my last annual report, have progressed as rapidly as available funds permit, and, in some instances, extended service tests are being carried out with experimental equipment that may lead to the adoption of improved types for issue.

* * * * *

With the cooperation of the Ordnance Department it has recently been made possible to relieve the Coast Artillery of the burden of

reloading the large number of heavy seacoast projectiles now in our harbor defenses. This action will undoubtedly have a most favorable effect on morale, especially at stations garrisoned by small caretaking detachments, and will allow more time for care of materiel out of service. While I have nothing but praise for the work of the caretakers, it can not be denied that there has been progressive deterioration in some important items of materiel. In the hope of checking this, many stations have been stripped of instruments, these being moved to storehouses. This office has consistently opposed this action as inspections made under such conditions are really valueless in determining the readiness of the entire defense for action, especially with respect to the system of communications. But so frequent are the reports that by no other means can the property at unmanned forts be protected against theft and all instruments subject to damage by moisture be protected against deterioration, that the policy has been approved with the proviso that all must be in place and tested during at least one annual inspection. The cooperation of the Corps Area Commanders in requiring complete tests is essential if the policy is continued.

APHORISME XLII

Those dangers are least avoyded which are unknown or unexpected, and those counsels are best carried which the enemies sees in execution before he hears them by relation. None in the Army must know to what Service Scipio leads his Troops, but only C. Laelius; nor is it fit things determined in Councell should bee communicated but to these without whom they cannot be effected: for as expedition is the life of action; so is secrecie of deliberation.—Ward's Animadversions of War (London, 1639).

The National Guard

By the HONORABLE DWIGHT F. DAVIS, Secretary of War

An address at the Annual Convention of the National Guard Association of the United States
at St. Paul, Minnesota, on October 27, 1927

MR. PRESIDENT and Officers of the National Guard:

You and I meet on a ground of mutual understanding. While the Secretary of War is charged with carrying out the policies of the President with respect to the armed land forces of the Nation and, as a representative of the President, he exercises control of the Army of the United States, the law recognizes him only as a civilian and not as a soldier. You men who are members of the National Guard of your State are first of all civilians — citizens — and second, military men. You and I therefore, while so closely allied with things military, meet on the common ground of citizenship and can see the military problems of the Nation, and your own in particular, from a common viewpoint.

The National Guard in all its long and honorable history has never in time of peace been as efficient, as well trained, as well equipped as it is today. It is a trained body of earnest, hard-working, patriotic citizens, unselfishly devoting their time, energy, and spirit to their community and their nation. The Guard is a fundamental, integral, essential factor in the national defense. In time of peace, it promotes local interests, aids sufferers in calamities, safeguards the community. In national emergencies, it marches beside the Regular Army in the defense of the nation. Our people generally do not fully appreciate the importance of the National Guard. The War Department, knowing its value, does appreciate it. I have come here today on behalf of the Regular Army and the War Department to indicate their recognition of the hard work, the enthusiastic assistance, and the unselfish loyalty of the National Guard.

In peace-time emergencies, the Guard has time and again proved its value to the community. In floods, cyclones, fires, and other overwhelming calamities, the Guard is immediately on the scene, rescuing and succoring the unfortunate victims, sheltering the homeless, protecting their property. How many panics have been avoided, how much looting prevented, how much suffering alleviated by the prompt action of those trained citizens, it is impossible to estimate. Units of the Guard are constantly called out in cases of local disasters. The Mississippi floods, the St. Louis cyclone are but outstanding examples. In

every case, the National Guard has made good. Both in actual emergencies and as a potential safeguard in case of disasters which may at any moment overwhelm a community without warning, the National Guard is worth far more than it costs in time of peace. In case of war, its value is beyond measurement.

Throughout our history this Nation has relied for defense on the patriotic urge of its people as opposed to strictly professional measures of protection.

During the Revolution the Continental Congress recognized the importance of having a body of men to reinforce the Continental, or Regular, Army and on July 18, 1775, recommended "that all able-bodied, effective men, between 16 and 50 years of age be formed into companies of militia." They could be called out only with the consent of the State legislatures. The Militia Act of May 8, 1792, laid down the truly democratic doctrine that every able-bodied male citizen owed military service to his country, and likewise provided for a system of enrollment and territorial recruiting.

In those earlier days reliance for national defense was placed on the citizen soldier but without adequate provision being made for his training or equipment. In fact, the citizen was required to "provide himself with a good musket or firelock, a sufficient bayonet and belt, two spare flints, and a knapsack, a pouch, with a box therein to contain not less than 24 cartridges . . ."

While throughout the years of our history the patriotic urge of our people has never failed in time of emergency, however willing and brave he might have been, the *untrained* citizen soldier could not compete successfully against a trained enemy. After our experiences in the Revolutionary War we placed our dependence upon the short-term volunteer. Scott's experience at Puebla, where large numbers of his short-time volunteers left him in the enemy's country with but 7,000 men to face 20,000 Mexican troops, and the early days of the Civil War, proved the inadequacy of that system.

Under the present plan, the fruit of our World War experience, we depend in an emergency upon the Army of the United States made up of the Regular Army, the National Guard, and the Organized Reserves. These last two are what the Militia Act of 1792 termed the "Militia." In effect, the "Militia" is composed of the units of trained citizen soldiers—the National Guard, and the untrained, potential citizen soldiers under trained citizen leaders who will be called into military service in an emergency to form the Organized Reserves. Our reliance is still on the citizen soldier—but with a tremendous difference. The National Guard of today is, in general, a well-organized, well-

equipped, well-officered, and well-trained body of citizen soldiers capable of performing the full duties of citizenship.

The full duties of citizenship comprehend three fundamental requirements which our form of Government rightfully demands of its citizens and which we, as citizens, rightfully consider our privileges. The citizen must exercise his duty of administration by voting for worthy officials of government; he must bear his proportionate part in the maintenance of public institutions and progress through the payment of taxes; and he must be ready to do his part to protect the country and its institutions against foes from within as well as from without. These are civic duties. When citizens prepare themselves to carry out efficiently the duty of protecting the country and organize themselves to this end, they are performing a civic duty. When they fight to defend the nation, they are performing a civic and a military duty.

The Guard has a dual allegiance—one to the State and one to the Nation. Its members have their livings to make in the highly competitive industrial and professional world. Only a man of strong moral fiber, actuated by a high sense of duty, is willing to devote the time and energy required of the guardsman. For the officer it means not one night a week at the armory, but many nights of study, planning, and preparation, if he is to do full justice to his organization. When an officer conducts instruction smoothly, without loss of motion or time, you may be sure that he has carefully planned its details in advance. Men work enthusiastically under such leadership, but such leadership demands intensive work. "The better planning in the office, the less lifting in the plant."

The National Guardsman and the Reservist, performing their civic duties under the allegiance to State and Nation, are outstanding examples of the complete citizen.

After creating the Army of the United States with three components, it was inevitable that there should have been a period of adjustment during which the members of each component found their proper places in the general plan. The Regular Army, in addition to its other duties, became the instructor of the other components. The National Guard, with more opportunity for training, began to find a way to cooperate with the newest component, the Organized Reserves. In recent years there has been an increasing cordiality between the various components of the Army of the United States. Teamwork has supplanted individual interest; the old indifference that came from lack of knowledge has

been replaced by mutual understanding. A man's sympathy with another's viewpoint is directly proportionate to his breadth of vision.

The efficiency of the National Guard has increased in a remarkable measure in the last few years. Last year showed healthy progress. Training methods and training management are better than ever before and, as a consequence, training has advanced along logical and progressive lines. The results are most encouraging.

It is gratifying to observe that a complete understanding of Basic Training as prescribed by the Militia Bureau exists throughout the National Guard, with the result that training in all organizations and staffs has become more uniform and a better coordination of training exists today than ever before. This better condition has brought about more suitable and reasonable training objectives controlled by the definite and well-understood limitations prescribed by the Militia Bureau. Reports from instructors on duty with the National Guard note an increase in the number of strictly Divisional Staff camps conducted and an eagerness of all concerned to take advantage of every opportunity to hold such camps.

The Assistant Secretary of War, Colonel Hanford MacNider, who is well known to many of you, and to whom I have delegated as my representative the immediate supervision of National Guard matters in the War Department, recently completed an airplane trip of over 25,000 miles during which he visited many of your summer training camps. In his report to me among other things Colonel MacNider said:

It is desired to emphasize the tremendous value of the war-trained commissioned personnel of the National Guard, which contributes largely to the present high state of efficiency evident throughout the whole establishment. The general officers and adjutants general are, without exception, conscientious and competent leaders and able administrators. Under present guidance and leadership, the National Guard is taking on added significance and importance in the National defense structure.

That this opinion is not an isolated one is indicated by the attitude of Corps Area Commanders. These officers are charged with the supervision of training of the National Guard in their respective Corps Areas. The enthusiasm which they are now showing in developing new and better methods of training, is evidence of their appreciation of the increased efficiency of the National Guard. The cooperation between the Corps Area Commanders and their instructor personnel on the one hand and the National Guard authorities in the various States on the other, has never been better. All Corps Area Commanders point to the

distinct advantages obtained from personal contact between the National Guard and its instructors and request that steps be taken to enable instructors to make more visits to units of the commands to which they are assigned. This appeal denotes a healthy interest and it is hoped that a way may be found to satisfy their desires.

The distinct advantages gained by those who have been able to attend one or more of the service schools has created an intense desire on the part of officers to continue their military education. The graduates of courses at the general and special service schools have returned to their units anxious to apply the sound doctrines of training they have acquired. In no small measure, the present excellent state of training of the Guard is attributable to these 1702 officers and 688 enlisted men who, up to June 30, 1927, have been able to attend service schools. During the last school year 294 officers and 126 enlisted men attended courses for National Guard personnel at the various Army service schools. The increased appropriation for attendance at service schools this year will enable more men to attend and is bound to produce excellent dividends.

These things are, indeed, of compelling interest and a source of pride to every citizen of the United States. In order to get a proper conception of the value of the National Guard as an element of our national defense one has but to recollect the suddenness with which war may descend upon a country, and the panicky state of mind of the people of the Atlantic seaboard when Cervera's fleet was supposed to be in the Western Atlantic. Should we be suddenly thrust into a war of any magnitude and a hostile force threaten our far-flung frontiers, our people will insistently demand that whatever military force we have be immediately dispatched to the threatened area, for the thought of their country being invaded is repugnant to them. There is an inherited prejudice against large standing armies, but there is no apparent opposition to a large National Guard, for in the National Guardsmen our people recognize first the citizen and second the soldier. With respect to the Regular, who is rarely stationed at his home, it seems that the reverse is true. There are but 85,000 Regular troops in the United States, combatant and non-combatant scattered from Maine to California and from the Lakes to the Gulf. Beyond any question, the National Guard at its existing peace strength would be drafted into the Federal service immediately and sent to the theater of operations as soon as it could be assembled. There may and probably would be

no opportunity for further training. It is, therefore, absolutely essential to our national security that the National Guard be maintained at all times in an advanced state of readiness, not only as to training but also as to completeness of organization for immediate combat service.

During the past year my attention has been directed to a number of cases involving irregularities in the care of public property in the hands of the National Guard and in the disbursement of public funds. In most cases no personal gain was involved and prompt disciplinary action was taken by the State authorities concerned. I am mentioning these matters because I am concerned lest these irregularities may have the effect of bringing the good name of the National Guard into question and may cause a loss of public confidence. I have been much gratified to learn from reports received of the corrective action taken in a large number of States and of the great improvement in the care of public property and in the disbursement of public funds.

During the past year it was my privilege to see in action the National Guard of several States. In the great disaster that befell our people in the Mississippi Valley, National Guard troops of Louisiana, Mississippi, Tennessee, Illinois, Arkansas, and Missouri were immediately called into the field. Their response was prompt and orderly. Efficiently they proceeded to the scene of action and, in spite of such obstacles as the hand of man alone could never create, they labored faithfully, bringing order out of chaos and relief to thousands of weary and homeless sufferers. Reports show that, in addition to those I have just mentioned, the National Guard of Maine, Rhode Island, New Jersey, Alabama, Florida, North and South Carolina, Kentucky, West Virginia, Kansas, and Washington were called upon to furnish assistance and protection to the civilian population during the past year. Their duties ranged from guarding prisons and jails in Alabama, Kentucky, North and South Carolina, Kansas, and Washington, through the field of rescue work at mine explosions and arsenal fires which occurred in West Virginia and New Jersey, and forest fires in Maine, strike duty in Rhode Island, to the manifold duties resulting from the great hurricane in Florida. In every case reported, the discipline and efficiency of the troops was commended. In time of such stress as those mentioned the value of a trained force within a State is recognized by all its people and they rejoice in the comfort of the cloak of security which such a realization gives them.

Reports received in the Militia Bureau show that 7,387 officers and enlisted men were employed on these duties for period varying from one week to three months.

The fine character of young citizens who are endeavoring, through service in the National Guard, to make themselves assets to their country in time of emergency is especially impressive. To me, this is indicative of the growing interest of the civilian population in the National Guard, and places a heavy responsibility upon the officers who are charged with the training of these young men.

The support given by the people to the National Guard depends upon their opinion of its reliability, fidelity, and military value which are always reflected in its leadership. I am thoroughly convinced that the National Guard is not only more efficient than ever before in its history, but I am certain that its curve of efficiency is rising steadily. This condition is due in a large measure to the high standard of leadership displayed by the administrative and tactical officers of the National Guard. The National Guard Association has contributed in a large measure to these satisfactory conditions and the thanks of the country are due you. As a citizen it gives me pleasure to express my personal appreciation and as the head of the War Department I extend its cordial thanks.

APHORISME XLV

Of all bad ingredients into the heart of man, there is none so poisonous as that of disdain. That General who sees this mischievous seed planted and grown amongst his Captains in time of their employments, and seeks not to root it up with a quick and sharp hand, is in the high road to his own ruin.—Ward's Animadversions of War (London, 1639).

Fire Adjustment from the Tactical Viewpoint

By MAJOR EDWARD J. CULLEN, C. A. C.

1. Fire adjustment must always play a most important part in the problem of fire action, and the artilleryman must be a thorough master of this detail of artillery science. But the "gunnery viewpoint" should not be permitted to overshadow nor to exercise a restraining influence upon the development of proper fire tactics. The sole purpose for the existence of artillery is to provide the means for the prompt and effective employment of the available fire power, whenever the tactical situation may demand it. The degree of fire effectiveness that can be accomplished in any tactical operation may be considered as being the direct resultant of three primary factors:

First—The manner of application, or in ordinary terms the "tactical employment," of the fire power of that artillery available for the operation.

Second—The degree of expertness in the use of armament and auxiliary instruments of which the personnel are capable.

Third—The maximum degree of precision of which the armament, the auxiliary instruments, and the calculation processes employed are capable.

Of these three factors, the first (the tactical employment of available fire power) is the dominating one in any tactical fire problem. Upon it, primarily, will depend the degree of fire effectiveness, measured in terms of "Hits per Gun per Minute," that can be attained in any artillery operation. The degree of training of the personnel, and the inherent degree of precision of the armament and auxiliary instruments, though important factors within themselves, are, by their very nature, secondary in character. Therefore, since fire adjustment is but an aid or a means toward the procurement of a suitable degree of precision of fire, we may safely say that it should not be permitted to dominate the fire problem. Fire adjustment must always be subordinated to the all-important question of "the proper tactical employment of the available fire power."

2. Tactical skill embraces both the ability to perceive clearly the end to be accomplished and a thorough knowledge of the use of the means available for the accomplishment of that end. But in any tac-

tical operation, the end to be accomplished is necessarily the paramount consideration, while matters of technique are important only in so far as the limitations of the available technical means may influence the accomplishment of the desired end. Fire adjustment is merely a matter of artillery technique designed to overcome, to a reasonable degree, the inherent limitations of the artillery means available for the accomplishment of the desired tactical end. To be of real value, fire adjustment must be a positive aid in the early procurement of a reasonable degree of fire effectiveness, and this without interference to the complete accomplishment of the tactical end sought. Therefore, it is reasonable to assume that any consideration of the subject of fire adjustment should involve, primarily, a consideration of those influences, both good and bad, which the use of the particular fire adjustment method may have upon the accomplishment of the assigned tactical mission.

3. Fire adjustment is a procedure in artillery technique employed to determine and to compensate for the approximate value of the resultant effect of the indeterminate errors present in the given fire problem. These indeterminate errors, being inherent in the armament, in the instruments, and in the processes employed, can never be entirely avoided nor eliminated, nor can their values ever be determined with mathematical exactness. By the employment of proper methods of technique these indeterminate errors may be maintained reasonably uniform from round to round, may be approximated in value as to total effect, and may be compensated for accordingly. These indeterminate errors are of two general classes, armament errors and calculation errors, but should be clearly distinguished from the so called "mistakes," for the latter are determinates and are capable of accurate evaluation, although we have all known of the sad case at some time or other when this evaluation came to us too late.

Armament Errors—Due to variations from round to round in the ballistic qualities of the ammunition and in the functioning of the separate pieces and their mounts.

Calculation Errors—Due to variations from round to round in the degree of mathematical exactitude with which the location of the objective, the conditions of the atmosphere, and the other influencing factors can be determined and compensated for.

It is apparent that in any particular artillery operation these two general classes of errors may embrace an almost indefinite number of indeterminates, either compensative or cumulative in character, and whose total resultant effect can never be determined with mathematical

exactness. In fire adjustment the artilleryman seeks, through mathematical procedure, merely a reliable approximation of the mean value of the resultant effect of the indeterminate errors existing in his given fire problem—this in order that he may compensate for this effect and thereby insure a reasonable degree of precision of fire, or, as it is usually called, “accuracy of fire.”

4. There are several well-known methods of fire adjustment, each of which is but a simple mathematical process for determining a relatively reliable mean value of an existing resultant effect. This mean value is determined through the medium of a suitable series of observations obtained under practically uniform conditions. Since the reliability of any mean value is as the square-root of the number of observations upon which it is based, any efficient method of fire adjustment will require the observation of the resultant effect of a reasonable number of separate rounds or salvos fired under practically uniform conditions. Where the proper technical facilities are provided, the requisite number of separate observations can be readily obtained in ordinary artillery operations against stationary objectives, and this without interference to the prompt procurement of a reasonable degree of fire effectiveness. Except in a few particularly special cases the number and extent of the indeterminate errors involved in the stationary-objective problem are relatively limited and uniform in character during the conduct of the ordinary fire action. But in firing against the moving objective, where the location of the target, and therefore the influencing effect of perhaps all the other factors in the ballistic problem, change from round to round, the fire-adjustment problem necessarily is more complicated and difficult. It is evident that the number and extent of the “armament errors” will be affected to but a slight degree by the mere fact that the objective is either moving or is stationary, since these indeterminates are very closely if not directly related to the gun and ammunition used, rather than to external conditions. But on the other hand the number and extent of the “calculation errors” encountered in the moving-objective problem are relatively unlimited as compared to the “calculation errors” involved in the ordinary stationary-objective problem, and it must be admitted that an extremely high rate of fire will be necessary to afford even a few observations of results obtained under reasonably uniform conditions of firing. Mathematically speaking, all methods of fire adjustment are but continuing approximation series utilized to place the center of impact upon the center of the objective. Tactical considerations always demand prompt fire effectiveness and consequently the artilleryman must promptly move the center of impact towards the objective as soon as a suitable number

of observed impacts justify his adopting a mean value that possesses a reasonable degree of reliability. This reasonable degree of reliability can be obtained only through the medium of a continuing approximation series, embracing a suitable number of observed results obtained under practically uniform conditions, and therefore fire adjustment must always be a continuing process of approximating.

5. It has become a common practice to consider the complete process of fire adjustment as consisting of two distinct phases: "trial fire" and "improvement fire." But in truth, the "trial fire" phase is merely the initial step in a continuing approximation series. The tactical demand for prompt fire effectiveness compels this initial step to be made before a sufficient number of observations have been obtained to insure the full reliability of the mean value that may be adopted. Consequently, this "trial fire" phase must be followed immediately by the so-called "improvement fire" phase, the two phases constituting one continuing approximation series, if a final mean value is to be obtained which will possess a reasonably high degree of reliability. Though, from the standpoint of artillery technique, it may be convenient to deal separately with the "trial fire" phase and the "improvement fire" phase, caution must be exercised lest by this practice we forget that mathematically the entire procedure of fire adjustment is but one continuing approximation series which seeks to establish a reasonably reliable mean value of the resultant effect of the indeterminate errors existing in the artillery fire problem.

6. During the late war, in stabilized situations, where, because of the necessity for economy, precision of fire was more to be desired than *immediate* effectiveness of fire, it became the accepted custom to consider the "adjustment fire" as a mere technical operation, preliminary to the actual combating of the assigned objective. Hence a sharp line of distinction was drawn between the "adjustment fire" and the "fire for effect," and these two were considered as being distinctly separate phases of artillery fire action, particularly in long-range work. Under the then existing circumstances, this practice was not bad technique, for it emphasized the importance of precision of fire. Nor, in general, can it be said that it was tactically unsound when employed in operations against stationary objectives in stabilized situations. At the cost of such small additional tactical advantage as might have been gained through the element of surprise, this practice aided in obtaining a relatively high degree of precision of fire, and this, in the long run, afforded the maximum fire effect with the minimum expenditure of ammunition. In other words, from a tactical point of view, the principle of "economy" demanded and received priority over the principle

of "surprise," while the "time element" (the duration of the operation) was generally a matter of minor importance. But this practice of considering "adjustment fire" as a thing apart from "fire for effect" is applicable only in special operations against stationary objectives where the element of surprise and the time element are not essential to tactical success.

7. In operations against moving objectives, either naval or aerial, such a practice would be unsound both tactically and technically. Here the tactical situation demands *immediate* effectiveness of fire, while the technical situation, from the standpoint of possible precision of fire, will only become more aggravated and more complicated because of the delays introduced. The moving objective, possessing full maneuver ability, will expose itself to attack for but a relatively short time and even then, by its rapid changes of position, will use every effort to prevent any lengthy series of observations of rounds or salvos fired under comparatively uniform conditions. Against the moving objective every shot fired, from the first to the last, should be considered "fire for effect," if the tactical mission of the artillery (prompt and effective use of its fire power) is to be accomplished. Every shot should be fired with the full intention, and with a reasonable expectation, of hitting the moving objective, while fire adjustment, the purely technical procedure necessary for insuring a reasonable degree of precision in this fire, should be conducted in conjunction therewith but should offer no interference to the accomplishment of the assigned tactical mission. To treat of "adjustment fire" and "fire for effect" as two separate and distinct phases of artillery fire action against a moving objective is a practice that may eventually have a serious detrimental effect upon proper tactical and technical training.

8. There are four well known and generally accepted methods of fire adjustment:

Trial Shot Method.

Successive Approximations Method.

Salvo Center of Impact Method.

Bracketing Method.

These methods are all more or less closely related, for their common basis can be found in the ordinary mathematical process employed in determining a reasonably reliable mean value through the medium of a series of observations. Each method is but a special arrangement of the basic mathematical process, and has been specially devised to meet certain limitations frequently encountered in artillery operations. These limitations are, in general, (a) the character and extent of the

observation of fire possible, (b) the total extent of time available for the artillery operation, and (c) the degree of precision of fire desired. The last should always be that degree of precision necessary to insure an effectiveness of fire suitable for the execution of the assigned tactical mission. As may be expected, one of these methods of fire adjustment may be more suitably adapted for use under a particular set of circumstances than is any of the others. This is a matter of general knowledge and requires no remark further than merely to emphasize the fact that, while a given method of fire adjustment may be suitable for use in a certain situation, it may be entirely unsuitable for use in some other situation. Since the above-enumerated methods of fire adjustment were devised primarily for use against stationary objectives, it is reasonable to expect that some or all these methods, in their orthodox form, may be entirely unsuitable from a practical standpoint for use against a moving objective. Every method of fire adjustment being dependent upon some form of observation of fire, the character and reliability of the observations which can be obtained, and the amount of time necessary to procure and report these observations must have a direct influence upon the general usefulness of the fire adjustment method employed in the particular situation.

9. In seeking a method of fire adjustment that will give suitable results when employed in the moving-objective fire problem, it is evident that some form of compromise is necessary. Those matters pertaining to tactics and those pertaining to technique, which may be involved in the problem, must be weighed, one against the other, primary importance being given necessarily to the tactical considerations. The following may be cited in illustration:

a. Trial-Shot Method—(When shots are to be fired against a fixed point in the contemplated field of fire, immediately preceding the opening of the combat.) Will the advantages of technique derived thereby offset the tactical disadvantages incurred by having disclosed to the enemy not only our own location but also our very probable intentions as to the area of combat? An observant and energetic enemy, by avoiding later the general vicinity of the selected trial-shot area, might offset any advantage of technique that we would otherwise have gained thereby.

b. Successive Approximations Method—(Where the time of flight plus the time required to apply the observed deviations would reduce the rate of fire very materially). Will the advantages of technique derived through this use of a more precise method of approximation offset the tactical disadvantages to be encountered from the reduced rate of fire? Can the enemy reasonably be expected to remain exposed

to attack sufficiently long to insure the same eventual effectiveness of our fire as might have been accomplished with less precision but with a greater volume of fire, and can this eventual effectiveness be procured in time to prevent the accomplishment of the enemy's tactical mission?

c. *Salvo Center of Impact Method*—Will the advantages of technique derived through this faster development of a reasonable degree of precision of fire offset the tactical disadvantages to be encountered in the probable increased expenditure of ammunition incurred by the use of this method of fire adjustment?

d. *Bracketing Method*—Will the advantages of technique derived through the increased ease of observation and the relative simplicity of the process offset the tactical disadvantages to be encountered in the greatly increased expenditure of ammunition to be expected from the use of this method?

The tactical effectiveness of fire is the resultant of three equally important factors: precision of fire, volume of fire, and duration (time) of fire. The tactical situation alone must control the degree of fire effectiveness that is required, and the tactical skill of the artilleryman must guide him in determining the relative importance of each of these factors in the given situation. It is true that in the absence of a reasonable degree of precision of fire there can be no reasonable expectation of fire effectiveness. But on the other hand, against a fast moving objective, exposed to attack for only a comparatively short period of time, all opportunity for developing the required fire effectiveness may be lost through employing slow methods of firing, methods which seek an unnecessary refinement of precision at the expense of the other factors, volume and time. The artillery may fail as readily in the accomplishment of its tactical mission by giving undue importance to the matter of fire adjustment as it will by totally ignoring this important detail of technique. To be of practical value in a particular situation, the method of fire adjustment employed must be capable of developing, within a suitable length of time, a degree of precision of fire which in turn will promote the effectiveness of fire to that degree required by the tactical mission. In other words, it may be said that the tactical situation demands paramount consideration in any question pertaining to the suitability of the method of fire adjustment to be employed therein.

10. It is a fact that there must be a reasonable degree of precision of fire if there is to be any expectation of accomplishing fire effectiveness. But it is also a well-recognized fact that there are other elements

as well as the indeterminate errors inherent in the armament, in the instruments, and in the calculation processes which exercise control over the degree of precision of fire that can be attained in a given fire action. The attainable degree of precision of fire in any fire problem is controlled primarily by three major factors:

a. The degree of accuracy employed in the mathematical determination of the firing data (Preparation of fire).

b. The degree of expertness of the personnel in the operation of the armament and instruments.

c. The degree of efficiency of the method of fire adjustment employed in compensating for the existing indeterminate errors involved in the entire problem.

It is quite apparent that the higher the degree of accuracy employed in computing firing data, and the greater the degree of expertness exercised in operating the armament, the less will be the demand for refinement in the fire-adjustment process required to insure a reasonable degree of precision of fire. In other words, the nearer that the "center of impact" can be placed to the center of the objective and maintained there by the simple "preparation of fire," the less will be the complexity of the ensuing fire-adjustment problem. By the term "preparation of fire" is meant those calculations involved in the determination of the basic range and direction to the objective or the predicted point, and in the determination and application of the position, the materiel, and the weather corrections necessary for this basic range and direction. Preparation of fire, in the stationary-objective problem, is a relatively simple process. The real difficulties and complications are encountered in the moving-objective problem, and the higher the speed of the objective the greater becomes the complexity of the problem. But the fact still remains that the process of "preparation of fire" is not only the first step but also the most important step in the development of reasonable precision of fire. Mistakes and carelessness in the preparation of fire cannot be readily compensated for by adjustment of fire; rather they will handicap, if not totally defeat, any method of fire adjustment that is later employed.

11. In connection with the matter of preparation of fire, special emphasis must be given to the importance of the accuracy of all records of previous firings, for it is upon these records that the artilleryman must base his future calculations as to reasonable expectations of fire effectiveness. By a careful analysis of the past performances of the artillery unit, making therein suitable allowances for the mistakes discovered, a reliable measure can be determined of the degree of fire

effectiveness that may reasonably be expected of this unit. The measure thus determined is the gauge of the precision of fire that may reasonably be expected in future firings, for it is the measure of the probable error of the unit (gun, battery, etc.) under practical conditions of service.

12. *Conclusions as to Fire Adjustment*—The development of a reasonable degree of fire effectiveness at extreme ranges, though important, is not so vital to tactical success as is the development of the maximum degree of fire effectiveness at decisive battle ranges, those ranges at which the moving objective, if not halted in its advance and driven back or destroyed, will successfully accomplish its assigned tactical mission.

The use of some method of fire adjustment is necessary to compensate for inherent indeterminate errors in the fire problem, but tactical considerations should govern and determine the suitability and the practicability of the method to be employed.

All known methods of fire adjustment are more or less closely related and are absolutely dependent upon some form of observation of fire. The efficiency of any method of fire adjustment employed in a given situation is seriously influenced, if not entirely controlled by the following considerations:

- a. The character of the "Preparation of Fire" made.
- b. The character of the "Observation of Fire" available.
- c. The amount of time available for the conduct of the various processes incident to the method of fire adjustment employed.
- d. The degree of "Precision of Fire" necessary to insure suitable fire effectiveness to meet the tactical requirements.

The tactical requirements, in the moving-objective problem, ordinarily demand prompt fire effectiveness and this in turn demands that fire be directed immediately against the objective with the full intention and with a reasonable expectation of hitting. The method of fire adjustment employed should be based upon the observation of the fire so delivered and should promote "precision of fire" without retarding the other factors "volume" and "time."

A suitable method of fire adjustment would be one requiring the use of a slightly slower rate of fire during the initial rounds or salvos, and affording a gradual and steady increase to maximum rate of fire as improvement and effectiveness of the fire were observed. This initial slow rate of fire is necessary, perhaps, in order to meet the limitations as to observation of fire imposed by the time of flight of the projectile.

So-called trial shots, ranging shots, and warming-up shots may, in some cases, be desirable for use in verifying the "preparation of fire," but their use should not be considered as some special abbreviated form of fire adjustment, nor some special preliminary phase of artillery fire action, particularly against moving objectives, for adjustment of fire is a continuing process throughout the entire fire action, from the first shot to the last, and these shots are but the initial stage thereof.

In the moving-objective problem, salvo firing is the only form of fire action that will afford more than a single observation of results accomplished under practically uniform conditions, and more than one observation is absolutely essential in establishing any reasonably reliable mean value. With a thorough knowledge of the *practical* probable error of the battery, with careful preparation of fire including calibration, with properly trained observers, and with the aid of a simple fire-adjustment graph, the battery commander should be able, by this form of fire action to accomplish promptly that reasonable degree of precision of fire (accuracy of fire) necessary to insure the fire effectiveness demanded by the tactical situation.

Artillery target practice is the principal form of training utilized in developing skill in the use of that arm. To be really efficient the artilleryman should possess not only a high degree of technical skill, but also an equally high degree of tactical skill. It is true that in order to possess a high degree of tactical skill one must be complete master of the technique of his arm. But it does not follow necessarily that the master of technique is thereby a skillful tactician. Special training in fire technique and special training in fire tactics are both equally essential, and while purely tactical training must necessarily involve a certain amount of included training in technique, the reverse is by no means the case. Since artillery target practice is but a form of training, the character of the training contemplated, tactical or technical, should be clearly specified in the directives from higher authority, and the various target-practice problems should be carefully designed accordingly. Each target-practice problem should be designed solely for one of the two fundamental purposes; either for training in fire technique (Gunnery) or for training in fire tactics. The latter will necessarily afford a certain amount of included training in fire technique, but the proper emphasis will have been placed on the broader subject, fire tactics. Only through special training of this character can the artilleryman obtain the experience and acquire the skill, both in technique and in tactics, which is necessary to insure his prompt and effective use of that fire power available to him whenever

or wherever the tactical situation may demand it. Fire problems devoted solely to Gunnery are necessary to afford the experience and practice essential for the development of skill in technique. They are important, very important, and constitute the foundation upon which tactical skill is later to be built. But tactical skill, the ultimate object of all military training, should be developed through the experience and practice afforded by properly designed tactical fire-problems.

14. *Conclusions as to Target Practice*—Since target practice is the means utilized to afford the requisite practice and experience for the development of skill in the use of artillery, and since two distinct classes of skill, technical and tactical, are essential in the making of the efficient artilleryman, target-practice problems of two distinct classes are believed to be necessary:

a. Technique or Gunnery problems, suitably devised not only to afford the training and experience necessary to insure a high degree of expertness in artillery technique upon the part of the personnel, but also to afford a thorough knowledge of the individual characteristics of the separate guns of the battery.

b. Tactical problems, suitably devised not only to afford the personnel that training and experience essential to the development of a high degree of tactical skill, but also to afford a test of the various phases of the local battle plans and to insure the necessary teamwork essential to tactical success.

Fire problems pertaining solely to technique or gunnery should involve problems against the stationary-objective and problems against the moving-objective. Being intended to meet the needs of the personnel of the individual battery, the responsibility for the scope and character of these problems might well be left to the battery commander thereof for he is the one most concerned with the questions of technique pertaining thereto. Tactical fire problems, being intended for the development of tactical skill, the test of prearranged battle-plans and the promotion of the efficiency of the tactical team, should necessarily be the responsibility of the higher tactical commanders. But though these tactical fire problems are intended primarily for tactical training, none of the measures necessary for the promotion of skill in technique should be overlooked or neglected in the conduct thereof.

Books: How to Judge and Use Them

By COLONEL O. L. SPAULDING, JR.,

Field Artillery, U. S. Army

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PATRICK HENRY said that he knew no way to judge of the future except by the past. Each one of us can think of instances where attempts have been made to set up machinery or to establish policies for the future on purely theoretical foundations, without inquiring first what has happened in similar cases in the past. The result may be good; so also they may be bad even when the inquiry has been made; but the chances of success are infinitely greater if one has in mind the sum of past experience when he makes his plans.

But a little learning is a dangerous thing. If one is going to look to the past only in order to select episodes which will tend to support plans already decided upon, it were better to make no inquiry at all. One must have a well-rounded general idea of the whole background of the problem before him. And how is he to get it?

In the face of a specific problem, especially an unfamiliar one, we may hesitate how to attack it. But if one acquires the habit of always asking first, what is the history of this problem, the method of attack resolves itself into collection and study of evidence. When a real diagnosis of a case has been made, the treatment follows; but only the quack treats mere symptoms.

Now evidence is a thing that we all are in the habit of handling officially. The rules of evidence are constantly before us, consciously guiding our action, throughout the sessions of a court martial.

A witness is brought in. Before he begins to testify he has to be identified. Who is the man, and how did he get his information? If he is put forward as an expert, what are his qualifications. This being determined, he begins his story, and each member begins to form his judgment upon it. Was he competent to understand what he saw or heard? Does he really remember, or does he only think he does? Is there any reason to suspect that he is not telling the truth, or that he is coloring it? Is his testimony inconsistent, or suspiciously perfect in its consistency? Does it agree with other testimony on the same subject? If not, can the statements be harmonized? If they are hopelessly inconsistent, which is entitled to credit? If any part is rejected as false, is it necessary to reject the whole? If not, what

cautions are necessary in using the residue? If gaps remain after piecing together all the testimony, is it possible to fill them?

All these questions, and many others, come to the mind of the member of a court martial. In answering them he is guided by certain rules, some of which appear artificial, but which in general are simply crystallized common sense.

Suppose now, instead of a court martial table and a witness, we have a desk and a printed or written statement. How can we judge of its evidential value? And, as a preliminary question, how does one get hold of it in the first place, out of the great masses of books and papers available?

As for the location and selection, the machinery for this is readily available. Even if the subject is entirely unfamiliar, one can at least consult encyclopædias and other books of reference, and get enough notion of it to ask intelligent questions. This stage being reached, the next thing is to consult the library catalogues; then, if necessary, tell one's troubles to a librarian. It is of no use to talk to the librarian at first, for until we know precisely what our troubles are we can't tell them. But intelligent questions to a librarian set the machinery in motion, and the machinery will turn out book lists or help the inquirer to make them. If manuscript records of the War Department are needed, it is one of the duties of the Historical Section of the War College to assist in identifying and locating them; and for present purposes we shall include them all under our general term "book."

The next step one must take alone. Others may lay material before us, but we ourselves must make up our own minds. Taking a book or paper from our reference list, what weight shall we give it? There are two things to avoid—indiscriminate acceptance and indiscriminate rejection. The totally inexperienced worker tends to the former error; if he sees it in print, it's so, and he searches no farther. When he has been bitten a few times he is likely to go to the other extreme—reject his evidence, bit by bit, on mere suspicion, and in the end despair of reaching a conclusion.

But the same processes of criticism that help in a court martial will help here. The problem is less technical, in that evidence may be admitted historically that would be inadmissible legally. The court is bound to make a decision, asking simply if the charges are sustained. There is a burden of proof, always distinctly borne by someone. Historically, there is no burden of proof, for there is no preconceived theory to be sustained or discarded. No evidence is inadmissible by reason of form. Every kind of evidence may and should be consid-

ered, for what it is worth, and a provisional conclusion may be of more value than no conclusion. But right here is the difficulty—"for what it is worth." What is it worth? The rules as to credibility are the same in law or history.

Now to appraise the value of our book. We begin to get a clue on the title page. Who is the publisher? There are certain well known firms in this country and in Europe who, before accepting a manuscript, turn it over to trained and competent editors for review. If the subject is a technical one, it is referred to a technical editor. To some slight extent the imprint of a good firm creates a presumption that the work is by someone competent to write on the subject, and also that it conforms to a certain technical and literary standard.

The title page also gives the first indications for identifying the witness. After the author's name will generally be found indications of his official or professional standing, academic degrees, etc.—at least enough to send us to "Who's Who" or other more dignified biographical works if we want to know more. He may be a most distinguished person along certain lines, but it does not necessarily follow that he is qualified to write on the subject in hand.

Examples of this will readily occur to anyone. Thus, we have the case of a practicing physician, who gradually developed into an extremely brilliant novelist and writer of short stories. Early in the recent war, impelled by his intense interest in current events, he turned his great literary ability and skill to historical writing, and published studies on the military history of some of the campaigns. Now there is nothing whatever in the writer's known record to give us the slightest confidence in either his historical narrative or his military criticism. Again, we have a man who began as a teacher of natural sciences; discovered in himself extraordinary talent as an imaginative story writer; developed an intense interest in world politics and economics; and finally published a very comprehensive outline of universal history. Again there is no reason, *a priori*, for paying any attention to anything he says.

It does not, however, follow from this that such books must be rejected. They may prove very useful, when properly criticized and evaluated. Sometimes we shall find the very best of books written by men whose title pages do not demonstrate all the qualification which appear necessary.

Take for example, Justin Smith's "War with Mexico." The title page shows the writer to have a definite standing as a teacher and writer on modern history, and also indicates that he has had a certain leaning toward military subjects, but there is nothing to indicate special mili-

tary knowledge, and nothing to prepare us for a book out of the ordinary. It proves, however, to be extraordinary in several ways—in skill and thoroughness of research, and in grasp of military problems.

Now how does one find this out, without careful reading of the entire text? And how could one unfamiliar with the subject find it out at all? This leads us to the next bit of machinery usually provided in the book itself.

Unless the book entirely explains itself, there will be a preface. This is not a thing to be skipped, but to be read carefully. It will tell us why and how the book was written, indicate to us the writer's point of view, and perhaps review to some extent the material used. Is the subject a new one, or has it been treated before? In either case, what was the reason for writing this book? Suppose we have a newly published life of Grant or of Napoleon. Does the writer present any newly discovered evidence, or a new point of view, justifying the production of a new book on a subject already so thoroughly covered? The preface should show; if it does not, we can not refrain from regarding the book with a certain suspicion.

Reverting to the Justin Smith book, we shall find that the preface does exactly this. It shows why a new book was needed; it shows what material was used, and how; and it indicates the pains taken by the writer to secure the necessary military knowledge. Incidentally, it shows the amazing industry, thoroughness, and patience with which the work was done.

Another point may well be kept in mind in this preliminary survey—the ability of the writer to handle his material. Take for instance the matter of language. Suppose the book is a study of Napoleon's campaigns. A large part of the material is in French, untranslated as yet in English; no one can make a real contribution to knowledge on this subject without ability to read French. On the other hand, we know that the French army has recently taken up in earnest the study of our Civil War. A Frenchman can do no serious work on this subject without a fairly good reading knowledge of English.

Note now the time when the book was written. Suppose again that it deals with Napoleon. The literature on this subject can be divided into periods, each of which stamps its character upon books of the time. Immediately after Napoleon's fall, a great number of historical books was written about him. The French throne was then occupied by a Bourbon, and all Europe was hostile to the former emperor. It would have been most difficult to find an impartial historian, and it would have been impossible to secure material for writing an impartial history.

While Napoleon was at St. Helena he dictated his memoirs. Realizing that he himself could never be recalled to the throne, his ambition was to have his son seated upon it. His memoirs reviewed the military and political events of his reign, but they were propaganda, not history. These memoirs, taken together with the stories picturing the great captive as a martyr, began to influence public opinion. Napoleon died in 1821, and in 1848 his nephew, later Napoleon III, was elected president of France. During this period we find intensely partisan literature, both for and against. After the rise to power of Napoleon III the character of the publications changed, and it became the fashion to glorify Napoleon.

In 1858, Napoleon III directed the publication of his uncle's correspondence; this work, in thirty-two volumes was completed in 1869. These papers had been inaccessible to the student, but it now became possible to reconstruct a satisfactory picture of the emperor. We may then conclude that, while earlier books are of value when properly used, no accurate and impartial history was possible before 1869.

The same point is illustrated by the publication of Wellington's Dispatches. Prior to that publication, a good account of the war in the Peninsula was out of the question, unless, as was the case with Napier, the writer had the good fortune to have access to the originals.

The publication of our own Rebellion Records marks a similar epoch. Previously, one who desired to write an accurate and impartial history of that war was compelled to make laborious search through ill-arranged files of documents, often failing to find what was needed. The Confederate papers were scattered, in the archives of the several southern states or in the hands of private persons. The more conscientious the investigator the more discouraging were the conditions to him. The memoirs of General Grant were long delayed, while he communicated with the War Department in an effort to find essential documents. So we may conclude that historical works on this war prior to the publication of the Records are to be regarded with a certain suspicion, and to be used only with caution.

Before coming to the text of the book, there is still another bit of machinery at our disposal—the table of contents. If the book is of sufficient size to require it, an outline of its contents is printed at the beginning. Previous inquiry may have led us to believe that the book has the proper character and standing, but it may be that it does not cover the precise points that we are looking for. The table of contents will tell us.

The process just reviewed will have led us to discard many of the items on our reference lists, and will have directed our attention to the

particular parts of the remaining ones that we must consult. Now we come to the statements in the text—the testimony of the witness.

These statements are of two classes,—events seen by the writer himself and events that he did not see. Our witness describes an event—a political movement, a battle, a trial; we must ascertain whether he was in a position to observe, and whether he was capable of appreciating what he saw. Conditions were once such that it was possible for an observer to view a battle and describe it completely. More recently, however, certainly since the French Revolution, no one man could observe a battle, much less a campaign. The historian must get his information at second-hand, at least in part.

What now is to be said of the ability of the observer to understand what takes place before his eyes? One might be present at a great surgical operation, but without some knowledge of anatomy and surgery most of it would be meaningless. Unless one is familiar with parliamentary law and with the rules of the House of Representatives, the skillful maneuvers on the floor pass unseen. One ignorant of the military art may view a combat without really seeing it; he is impressed by the incidentals—the thunder of the guns, the casualties—but he does not at all grasp the tactical meaning of what he sees.

We conclude, then, that the observer must be capable of intelligent observation. To be an eye witness is not enough.

But the great mass of events described in our book will be such as the writer himself did not observe. He must call others to witness.

The historian's study not being a court of law, he need not reject hearsay evidence, although it is his duty to select it honestly and label it correctly. But many of the legal rules of evidence are applicable, here as elsewhere.

Thus the law requires the "best evidence." When the writer of history makes a statement of fact, he must have behind him the best evidence on the subject.

Take for example the campaign of Marengo. This campaign is a fascinating one, and has been described by numerous writers, from Jomini down, with varying intelligence and on varying collections of evidence. A few years ago the Historical Section of the French General Staff made an exhaustive study of it, using all the published material, French, Austrian, and Italian, including Napoleon's correspondence, and many unpublished documents. They then prepared two volumes, written with the utmost care, and appended copies of the most important documents cited. The documents used, and this book as a compilation and interpretation of them, constitute the "best evidence." One

may not accept all the conclusions of the book, but he has no right to form a conclusion without considering it.

Smith's "War with Mexico" is again a case in point. Never before has so thorough a study of the documents been made. Never again will there be an excuse for writing on the subject without reference to them.

Since each book that we have to consider is the testimony, not of a single witness but of many witnesses, we must inquire whether the writer has shown good faith and good judgment in his selection. In order to make such selections, the writer must have had a good idea of the literature of the subject. How can we tell? The answer is, that it is the duty of every writer to inform his reader who his witnesses are. This may be done by a general statement in the preface; by an appendix giving a list of sources quoted, with perhaps a bibliographic remark on each; by a system of notes; or by a combination of these methods.

A mere general statement in the preface may perhaps suffice in a very simple case, but ordinarily is of little use. A detailed list of sources appended is better, in that it gives the reader a better start if he wishes to make further study. But if he wishes to test the accuracy of the writer's work he is burdened with the task of reviewing all these sources. This task should not be imposed upon him. It is the duty of the writer in order to show good faith and to lighten the work of the reader, not only to give a list of his witnesses, but to name the witness relied upon for each material statement of fact. This requires little additional work for the writer—he knows when he makes the statement where he got it. If he is not willing to say where he got it, we must look upon his work with some uncertainty, if not with some suspicion.

We often hear a work on history praised because it is interesting. It is well that it should be interestingly written; a good stock in trade is the more valuable if well and conveniently arranged, and it is not injured by good window dressing. But history is a science and not a branch of literature. Literary technique is to it merely a tool. The worst enemy of historical progress is the amateur who, with the audacity of ignorance, tries to be interesting to conceal his lack of material. His work is a trap for the unwary, and spreads false doctrine. But he can always be detected and exposed if the reader applies, and demands the application of, the method indicated above.

Another important question is, why the book was written. On a court martial we always know whether a witness is put forward by the prosecution or the defense. If a witness is on bad terms with the accused, we do not reject his testimony, but we keep that fact in mind in weighing it. We do not reject Ripley's book on the Mexican War, for he has an eye witness of many of the events related, and was in a posi-

tion to have official knowledge of many more; but when he speaks of matters that even remotely touch General Pillow, we are entitled to know of his intimate association with and partisanship for that officer. Most books are written for a purpose, only exceptionally are they simply a record of facts. Biographies are generally written to defend. Even if the writer starts out to be impartial he usually becomes the champion of his subject and is prepared to meet all comers. He resents, perhaps unconsciously, all criticism, and is intent upon the creation of a hero.

If one wishes to study the causes of the recent war, he must consider statements from all countries, all of them intensely partisan, many of them intentionally misleading. They sin not only by commission, but also by omission, for the questions involved are still bound up with state policy and politics, and documents are withheld of necessity. We must recognize that history can not pretend to form definite judgments so soon after the event. The writer who shows himself too sure on complicated questions of this special nature condemns his own book.

But it does not follow that it is not legitimate to discuss these subjects at all. We need something for our own current use. Careful work with the available material will also be of great assistance to the future historian, who will understand and discount the prejudices of the time. And even the most partisan writings will not only contribute to his actual substantive knowledge of fact, but will aid him in comprehending the prejudices—which themselves are historical facts.

The statements of the partisan documents and writings will conflict, and this is of course annoying. But if we have enough of them we can eliminate the error—just as we may do in topographical work, getting an accurate result out of several inaccurate plottings. First we study each statement in the light of what we already know—reject palpably false statements and tabulate the credible. Then we bring several such statements together and compare them—secure intersections to determine the approximate positions of points. The more statements we can get, the more points in each one may be tested, and items confirmed or rejected.

At best, gaps will remain after all the checking. Keeping to the map simile, the writer must fill in the detail. Interpolated points and contours on a map are of less authority than those instrumentally located, but they are useful and necessary. The more we know of the trigonometric points forming the skeleton of a map, and of the processes by which it was made and filled in, the more useful the map is to us. For example, in a certain part of the French theater of operations the American troops, upon arrival, found only the 1/80,000 hachured maps. Con-

tours were sketched upon these sheets by eye, and the maps then reproduced on a scale of 1/20,000. The maps thus constructed, while by no means as accurate as the standard 1/20,000 sheets, were serviceable, provided one knew how they were produced. They might have been misleading to one who did not.

This illustrates the necessity, already mentioned, of selecting sources thoughtfully and making reference to them conscientiously. Even if we have confidence in the ability and honesty of a writer, we can not really evaluate his work without this.

Suppose the question is as to variations in public sentiment during the recent war, or during any other period. The contemporary press is the natural place to find it, and evidently this source will give satisfactory results only if the study is exhaustive. In one case of which I have personal knowledge, a writer, after collecting his substantive material, came to Washington and spent an entire winter in the Library of Congress, reading all the newspapers he could get for the period under study. This he did, not to collect additional facts, although doubtless he may have gleaned some, but primarily to get the necessary atmosphere. Even better, sometimes, may be the confidential dispatches of ambassadors to their home governments—usually unavailable for recent events, but often to be had for more remote ones. Such dispatches are based not only upon study of the current press, but upon personal and often confidential conversations with political leaders. Their writers are trained observers, with trained assistants, and with every variety of means for getting information—fair means, and perhaps sometimes foul, but all effective. And considering the purpose of the dispatches, there is every reason to find the statements accurate and uncolored. Should we not be allowed to know what sources our writer has used?

Fine examples of bibliographical work are found in the Cambridge Historical Series, in the War College Library. Each volume contains its bibliography, and it is interesting to see the variety of sources drawn upon. For an event in Paris, perhaps, material is sought and found in the French, Austrian, Venetian and Papal archives. Reports and letters of ministers, generals, clericals, and private persons are brought forward—masses of testimony, permitting one to make a statement of fact without fear. This is work that we can not do for ourselves—it has been done for us, and our part is to make intelligent use of what has been done.

All the great governments have established archives, where their historical documents are assembled, preserved, classified and indexed. Documents are exchanged. Thus the Library of Congress has for years been obtaining from the English, French, and Spanish governments copies of important manuscripts relating to our early history. The His-

torical Section of the War College has, in the last two or three years, built up a system by which its own representatives, stationed abroad, are enabled to go direct to the French, English, and German military archives, and make copies of documents needed for study of our military operations abroad. As yet our own government has not reached the point of appreciating the value of an archival system. Calls for a Hall of Archives have not yet effectively impressed Congress; and perhaps this is not surprising, since no single government department has yet attempted to establish an archive system even in its own restricted sphere. In the War Department, at least, a certain amount of consideration is being given to such a plan, and results will surely come, sooner or later. Meanwhile, as a distinguished historical worker recently remarked, documents are being preserved by the grace of God.

As previously remarked, the best of bibliographical notes are not enough in themselves. They must be applied to the text by a system of specific references. In most cases this is simple—mere citations in foot or marginal notes. Sometimes when the material is voluminous and largely in the form of scattered manuscripts this will not do. Smith's "War with Mexico," already mentioned as an illustration of so many things, shows a very ingenious system of appendices devised as a solution to its own specific problem.

Here it will be well to consider another specific instance of book construction. You will find in the War College Library a set of books called the Great Captains Series, written by the late Col. T. A. Dodge. This series is a history of the great soldiers of ancient and modern times, down to Napoleon.

The writer received a thorough education both in this country and in Germany. He was an officer of the Union Army in the Civil War, where he lost a leg. He was a student of recognized ability and a man of the highest character. When he decided to write the lives of the world's greatest soldiers he made careful preparation. He had ample means, and visited personally the great battlefields, studying on the ground the best accounts existing. He obtained access to foreign archives and made exhaustive study. He was familiar with many languages and read his authorities in the original. Twenty years were devoted to the work.

The books were published by a first-class firm, Appleton & Co. The prefaces give summary statement of authorities, and the last volume includes an extended bibliography. No other American, and few others anywhere, ever undertook so ambitious a project.

For the general reader, there is no better work. Yet to the critical student it will prove of little value. Unfortunately, Colonel Dodge gave no specific citations of authority for specific statements. The reader

must either rely entirely upon the writer's ability, care and judgment, or else make an elaborate search himself. The bibliography is useful in a general way, but does not enable the student either to check for accuracy, or to find readily the authorities necessary for more extended study of specific points. Colonel Dodge has done a great work, but much of it is lost because he did not make of record his authorities in detail.

Now when we come to compare various sources and check them against each other, it is of primary importance to know whether we are comparing distinct statements, or different versions of the same statement. Two independent statements are of more value than twenty dependent ones. Suppose the question is, whether or not a certain division occupied a certain village at a certain time. Perhaps we have statements by the division commander, his chief of staff, and his operations officer. Are these independent? By no means. If, however, we can get a statement by the opposing division commander, we have a real check.

Again, statements may not be independent even though they are not in agreement. One may be a careless or an intentionally colored copy of the other. This class of statements calls for vigilance if we are not to be misled. Take the same case, the occupation of a village. A patrol leader sends in a message saying that he has entered the village of X. His company commander reports that he has men there. The battalion commander reports Company "A" there; the regimental commander makes it the 1st Battalion; and so on, until the division commander telephones the corps that his right brigade holds the town. If the messages are preserved, the misunderstanding will be cleared up later. But suppose that these messages, being hasty pencil notes or unrecorded telephone conversations, are all lost except the division commander's. Then we may get the set of statements previously described—several officers at headquarters giving, each in his own words, the substance of the information on record there. This lays the foundation for a first-class controversy after the campaign.

To put these ideas in a more concrete form, let us consider for a moment the characteristics of certain classes of evidence with which we are likely to have to deal—either directly, in order to use them ourselves, or indirectly, in judging the work of a writer who uses them. If a writer cites only one source, or one class of sources, and others are known to have been available, suspect him.

Official reports are among the most valuable papers we have, in dealing with military operations. But they are extremely misleading if not checked against other reports, messages, orders, and everything else that can be found. Note the date of the report; the longer after the event, the more likely it is to be afterthought, or perhaps merely a com-

pilation of contemporary papers—a historical monograph, not a historical document. Note also the signer; delayed reports are often of necessity rendered by a successor of the actual commander, not personally familiar with the events. And even at best, the report is more or less colored by interest in the reputation and solicitude for the spirit of the units and individuals concerned.

General Scott, for example, made it a practice to accept any situation that his subordinates brought about, assume full responsibility, modify his own plans if necessary, and go ahead as if he meant it that way all the time. His report on Cerro Gordo narrates very well and very accurately what took place, in so far as it had come to his knowledge at the time, but it adds that the battle was fought precisely as he had intended. If we did not have his order, we should form a false impression of his plan of attack, for we actually find a marked variance. He could not change the situation existing, and he had to go on fighting the campaign with the same troops, so he raised no question on their action that could be avoided.

Taylor's course in the same war was somewhat different. His reports were written by an acute military student, a clever and discreet artist in words; it has been said that they "never lied and never told the truth." In every single battle, from Palo Alto to Buena Vista, the report is so phrased that, while it is difficult to challenge any specific statement of fact, the impression is precisely that one most creditable to the commander. Certain facts are played up, others toned down, still others quietly omitted.

Personal letters are another important source, but these too, are to be handled with care. They differ greatly in value, according to the character of the writer, the person to whom written and the time and circumstances of writing. In a letter to a relative or close friend one will incline to frankness, and things will be found that would not appear in a report. But one must watch for exaggerations, for a private letter is subject to little check or restraint. Boasting of one's own work, or unwarranted attack upon that of others, may be found; letter writers are often greatly embarrassed when they find that their private letters have been published by some indiscreet friend. Letters written in the midst of exciting events will be colored by that excitement, just as conversation is. Censorship of the mails works both ways; it tends to counteract some of the impulses to misrepresentation, and on the other hand makes a writer more restrained and diplomatic.

Letters by the writer of an official report sometimes furnish a very good check; he is apt to unburden his mind of things that he deems it unwise to say in the report, and sometimes even contradicts it. Thus

we find in the Rebellion Records that General McClellan, at 10 P. M. on May 5, 1862, telegraphed the Secretary of War that "my entire force is undoubtedly considerably inferior to that of the rebels, who still fight well, but I will do all I can with the force at my disposal." Just twenty minutes before he had said in a dispatch to General Franklin, "I think the enemy will evacuate during the night; if not I can probably beat him." Many of the same general's private letters, published in his "Own Story," give a different view from that of his reports.

A letter written long after the event is of much less evidential value than a contemporary one. A story is told of Colonel Scott, who was in charge of the compilation of the Rebellion Records, illustrating the tricks of memory.

One day an officer came into his office, and excitedly exclaimed, "Did you say I was not in the second battle of Bull Run?" "No, not exactly that," said Scott. "Well, Bob Scott," resumed the other, "I was told you said so, and I came in to put daylight through you if you stick to it." "Oh, no," replied Scott, "I never said you were not in that battle. What I said was that you yourself, in an official report dated the day of the battle, said you were in the Cumberland Valley, a hundred miles from Centerville and Bull Run." Scott sent for the report; the officer read it through twice in silence, then got up and left without a word.

Bulletins published by an army are intended largely for moral effect. Any information is omitted that might give aid and comfort to the enemy. Successes are emphasized, reverses omitted or minimized. Napoleon's bulletins are shining examples; so also many of the daily communiques of the recent war. Nevertheless these are good historical material when intelligently handled.

Diaries are very valuable when the entries were contemporaneous and intended for personal use. They are much less so when written up later, and with an idea that someone else was to see them.

In using newspapers, it is necessary to remember that they generally report first impressions and unverified reports; also that they are generally partisan, closely allied with political movements, and in time of war subject to censorship.

The Historical Section has a considerable collection of histories prepared by American divisions and regiments of the war with Germany. All are, of course, written from the point of view of the unit concerned, and are necessarily one-sided; but in their preparation, one can find every possible variation, from a thoughtful, careful narrative, evidently intended to convey the truth, to violently and almost indecently partisan statements, so evidently intended to glorify and defame that they instantly defeat their own ends. To take only an ex-

tremely moderate case, one regimental history gives this account of an episode on the Vesle River in August, 1918:

"A battalion of the Nth Infantry had just retreated from X. The warnings of one of its officers, added to the approach of daylight, spread dismay to the wagoners, whom neither threats nor persuasion could force nearer than 800 yards of the village. At that point, therefore, the material had to be unloaded. Quite the opposite effect, however, was produced upon Lieutenant R—— and his ten men, who had been ordered to proceed to X to unload the wagons. To X they proceeded, and, unassisted, occupied and held the town until the following noon. Our regiment, XXX was more than ready to furnish an advance patrol, and to supplement with a little valor the greater discretion of the Nth Infantry."

This narrative, in questionable taste as to form, even if strictly true, very promptly drew fire from the other regiment concerned, whose commanding officer has stated positively and on his own personal knowledge that there was no withdrawal. Stirred by the attack upon his own troops, he comes back with a counter-attack, saying, "if the A regiment was ever present, it kept so far to the rear that I never saw it." And here we have the material for another controversy.

Yet all of these books are useful. Knowing them for just what they are, a careful reader can easily discount them. Their greatest value is that among the extravagant sentences there are facts not contained in other and better prepared works, harmonizing perfectly with other independent statements, and filling gaps. Sometimes there will be unconscious admissions against interest, throwing light upon obscure points.

In the Historical Section also are several German regimental histories, prepared by representatives of the regiments, but the plan dictated and the execution supervised by the Federal Archives. They consist almost entirely of extracts from official documents, with only enough new text to connect them. The selection of material may have been partisan, but there is no room for falsification of the record, and there is no glorification or defamation.

Some time ago a well known manufacturer of automobiles was reported as saying that he "did not believe in history." Similar remarks, it must be admitted, have at times been heard even from better educated persons. If this statement was the result of thought at all, of which I am by no means sure, it was probably based upon consideration of the kind of evidence upon which history must depend. He probably expected mathematical accuracy, which is unattainable except in mathematics. And even in mathematics we find the calculus of probabilities.

All business, all human activity, all life, is a matter of probabilities rather than of absolute accuracy.

Books, like men, vary in character. Each book reflects the character of the author and the purpose he had in view. Some are prepared with no great desire to tell the truth, but rather to please and entertain the reader. Many writers will take a historical subject, but will in fact write a piece of fiction; and unthinking readers will praise the book as interesting, forgetting that history is a science and not literature. Some books are written to deceive. Some few show us an author with a judicial temperament, who spares no pains to search for evidence, and, when found, weighs it carefully and intelligently. He does not ask the reader to take his statements on faith, but by means of convenient references directs the student to his sources. He draws inferences and conclusions but he sets them down as such, that the reader may accept or reject. In his preface, he states his object in writing the book, and for convenience he appends a bibliographical note. Such an author is deserving of the highest consideration; in fact, we should go to the length of requiring all writers to follow this path. The book then carries with it, on its face, the necessary proof of sincerity and truth. When we demand this standard for an author, we go far toward eliminating the charlatan from a science in which everyone has a personal interest.

It might now be of interest to examine the method used by one of our greatest historians to obtain his sources.

George Bancroft, the historian of the United States, was educated at Phillips Exeter Academy, Harvard, Heidelberg, Göttingen and Berlin. His natural gifts and his education eminently qualified him to undertake his task. At the time he wrote, no exhaustive history of the events leading to, and including, the American Revolution had been written, as no one had undertaken the task of collecting the sources; in view of which Mr. Bancroft determined to collect the sources and present this period in keeping with its importance. He inspected the archives of the Federal government and of the thirteen original states. He went over the important collections of papers amassed by prominent actors of the Revolution. In addition to his large private library, he consulted those of Harvard University, and the Boston Athenaeum. He then visited the British Museum. In the State Paper Office he studied the documents relating to the Revolutionary period, which included voluminous correspondence of all military and civil officers and Indian Agents in America; memorials of the American Commissioners of Customs; narratives, affidavits, information and answers of witnesses illustrating the most important occurrences, the journal of the Board of Trade; instructions and letters sent to America by the King and the Secretaries of

State, etc. Relating to these papers, Mr. Bancroft says, "I examined these masses of documents slowly and carefully; I had access to everything that is preserved; and of no paper however secret it may have been in its day, or whatever its complexion, was a copy refused me."

Mr. Bancroft now decided that it was necessary to study the character of the ministers themselves, so he obtained from private as well as public sources, the private letters of the English ministers of state, many of which were unpublished. To study the character of the King he read personal letters and notes prepared by George III to Lord North, the Prime Minister. These were obtained from the family of Lord North.

The controversy between Great Britain and her colonies attracted at the time the attention of all Europe, in fact it was the subject of leading interest, so Mr. Bancroft went from London to Paris. M. Guizot, the Premier of France, opened the French Archives; "You shall see everything that we have," he said. The reports of the French agents sent secretly to the colonies; the papers tracing the progress of the French alliance including the opinion of the Cabinet Council to the King, were all gone over, also the secret diplomatic complications between France, England, Holland, Prussia, Russia, Spain. The papers in the custody of Minister of Marine and of War were examined, reports of the military and naval officers, with accompanying charts, plans, etc. Mr. Bancroft then proceeded to Germany. At Berlin he made copies of the reports sent to the Duke of Brunswick by his military officers serving with the "Hessian" troops in America. He obtained copies of the correspondence of Frederick the Great with his foreign representatives on the subject of England and her colonies. From Moscow, Vienna, Holland and Spain, documents were obtained relative to the American War, from the standpoint of these various countries. It is interesting to note that Mr. Bancroft was greatly assisted in Germany by "Lt. Genl. von Moltke, Chief of the Prussian Staff." The contemporary criticisms of German officers on the military operations in America were carefully studied—"My object in seeking so full a collection of military papers was to insure correct comprehension of military events by comparing the narratives, opinions, and judgments of distinguished critics educated as soldiers."

The above indicates to us the broad geographical distribution of documents relating to great historical events. This is, in itself, a great advantage as the destruction of records at one point can, in many cases, be remedied by referring to records located elsewhere, which describe the event. There is also another advantage. In the controversy between England and her colonies, all Europe was interested, particularly France, Spain, and Prussia. The representatives from the courts of these countries in London were usually trained, educated observers. They

were under instructions to keep fully advised of events and to make frequent and accurate reports. These reports were written from the viewpoint of the interests of the court concerned. They are, therefore, independent documents and as such invaluable to the historian.

We see, then, the enormous task that writing real history presents. The reason for looking into this is not to frighten one with the idea of the difficulty, but rather to show how easy the task has been made for us by the great students who have preceded us. Knowledge of the facts can be gained only from the documents; we can not see the documents, and must depend upon the reports of those who have. Hence the urgent necessity of looking into the methods of work of those upon whom we depend, of intelligently judging their work. If the documents have been carelessly or dishonestly used, the result will be a misleading narrative; if carefully, intelligently, patiently and honestly, it will be one that may be safely trusted.

I have tried to point out the principles upon which such a judgment must rest. The process of criticism outlined is not a time-wasting one, it is a time saver. If we apply the process to our daily problems of research, we shall readily eliminate the rubbish and come to rest our case upon the solid material. Then, if we are as conscientious in the construction of our reports as we require our authorities to be, those reports will prove of value to future students of the same questions.

APHORISME XLVI

It is a hinderance to the Generalls service, and a furtherance to the Generalls destruction, to give any of his chiefe Officers any manifest cause of discontent, and yet after imploy him in any place of great charge: for neither can he be assured of his fidelity when he is used, nor he of his Generalls favor being accused.—Ward's Animadversions of War (London, 1639).



COLONEL IRA A. HAYNES

Commandant, Coast Artillery School, February 28, 1913-October 1, 1916

PROFESSIONAL NOTES

The Sixty-fifth Coast Artillery (Antiaircraft)

The Coat of Arms of the 65th Coast Artillery (AA) was approved on July 15, 1925, and its blazonry is:

Shield: *Gules* (red) six piles *or* (gold), from Chief terminating at the nombril point, over all a strangler fig tree (*Ficus specia*) standing on a plot of ground, all proper (in natural colors).

Crest: On a wreath of the colors (gold and red), an ocelot rampant *or* (gold) spotted *sable* (black).

Motto: *Surson* (Upwards).

The shield is red for artillery; the yellows piles or wedges signify the direction of antiaircraft fire; the six wedges and the five spaces of red between gives the number 65, the designation of the organization. The strangler fig tree is peculiar to tropical America and indicates the birthplace of the regiment as the Canal Zone. The crest is an ocelot, a native of Panama which roams as far south as Patagonia, further signifying the character of the unit, as this animal usually climbs trees and fights upwards for its prey.

The ocelot rampant in metal and enamel is worn by the personnel of the regiment as its distinct regimental badge.

The 65th Coast Artillery was organized in 1924, and the history of its units is as follows:

Headquarters Battery was organized in 1907 as the 144th Company, Coast Artillery Corps, at Fort Moultrie, South Carolina; was named the 8th Company, Fort Grant, in 1916, and the 8th Company, Coast Defenses of Balboa, in 1917; redesignated the 144th Company, Coast Artillery Corps, in 1922; and became Headquarters Battery, 65th Coast Artillery, in 1924.

Service Battery was organized in 1899 at Fort McHenry, Maryland, as Battery N, 6th Regiment of Artillery, and saw service in the Philippines during the insurrection in November, 1899, to October, 1901; became the 70th Company, Coast Artillery, in 1901, the 7th Company, Fort Mills, P. I., in 1916, and 7th Company, Coast Defenses of Manila and Subic Bays in 1917; redesignated the 70th Company, Coast Artillery Corps, in 1922; and became Service Battery, 65th Coast Artillery, in 1924.

Headquarters Detachment and Combat Train, 1st Battalion, was organized in 1901 at Fort Mott, New Jersey, as the 119th Company, Coast Artillery Corps; designated 4th Company, Fort Sherman, C. Z., in 1916, and 4th Company, Coast Defenses of Cristobal, in 1917; was again named 119th Company, Coast Artillery Corps, in 1922; and became Headquarters Detachment and Combat Train, 1st Battalion, 65th Coast Artillery, in 1924.

Battery A was organized in 1901 at Fort Screven, Georgia, as the 116th Company, Coast Artillery Corps; designated the 4th Company, Fort Grant, C. Z., in 1916, and 4th Company, Coast Defenses of Balboa, in 1917; renamed 116th Company, Coast Artillery Corps, in 1922; and became Battery A, 65th Coast Artillery, in 1924.

Battery B was organized in 1901 at Fort Slocum, New York, as the 87th Company, Coast Artillery; named the 2d Company, Fort Grant, C. Z., in 1916, and 2d Company, Coast Defenses of Balboa, in 1917; redesignated 87th Company, Coast Artillery Corps, in 1922; and became Battery B, 65th Coast Artillery, in 1924.

Battery C was organized in 1917 as the 2d Company, Fort Randolph, C. Z.; designated 8th Company, Coast Defenses of Cristobal, in the same year; became the 195th Company, Coast Artillery Corps, in 1922; and named Battery C, 65th Coast Artillery, in 1924.

Battery D was organized in 1901 at Fort Warren, Massachusetts, as the 124th Company, Coast Artillery; named 2d Company, Fort Sherman, C. Z., in 1916, and 2d Company, Coast Defenses of Cristobal, in 1917; redesignated 124th Company, Coast Artillery Corps, in 1922; and became Battery D, 65th Coast Artillery, in 1924.

Battery E was organized in 1916 as the 7th Company, Fort Grant, C. Z.; named 7th Company, Coast Defenses of Balboa, in 1917; designated 194th Company, Coast Artillery Corps, in 1922; and became Battery E, 65th Coast Artillery, in 1924.

Battery F was organized in 1901 at Fort Banks, Massachusetts, as the 89th Company, Coast Artillery; designated 4th Company, Fort Williams, Maine, in 1916; became Battery F, 6th Provisional Regiment, Coast Artillery Corps, in 1917, and Battery F, 51st Artillery, Coast Artillery Corps, in February, 1918; changed to Battery C, 57th Artillery, Coast Artillery Corps, in July, 1918; saw actual service in France in the Toul Sector from May 22 to September 11, St. Mihiel offensive from September 12 to 16, and Meuse-Argonne offensive from the 26th of September to the 11th of November, 1918; was disbanded at Camp Lewis, Washington, in 1921; and was reconstituted and consolidated with the 3d Company, Coast Defenses of San Diego, and designated 89th Company, Coast Artillery Corps, in 1922. The 3d Company, Coast Defenses of San Diego, was organized in 1917 as the 3d Company, Fort Rosecrans, California; later became the 3d Company, Coast Defenses of San Diego; and became Battery F, 65th Coast Artillery, in 1924.

Battery G was organized in 1917 as the 1st Company, Fort DeLesseps, C. Z., and later in the same year became the 6th Company, Coast Defenses of Cristobal; was named 193d Company, Coast Artillery Corps, in 1922; and became Battery G, 65th Coast Artillery, in 1924.

Battery H was organized in 1917 as the 4th Company, Fort Sherman, C. Z., and later became the 6th Company, Coast Defenses of Cristobal; was named 192d Company, Coast Artillery Corps, in 1922; and became Battery H, 65th Coast Artillery, in 1924.

War Technique of the Present Day

The March, 1927, issue of the German monthly journal *Heeres Technik* contains a review, by a writer over the signature "—g—" of a book written by Lieutenant General Schwarte, German Army, retired, and recently issued by the Berlin military publishers E. S. Mittler & Son, with the title above shown. From this book it becomes clear that Germany was guilty of many neglects and oversights, not only in its pre-war preparations for the contest but also in the conduct of the war, that an intelligent estimate of the situation ought to have foreseen and neglect of which, as set forth by the author of this book, now appears to be inexcusable. How much of this is chargeable to negligence, carelessness, or indifference on part of the great German general staff or to the military administrative branches of the general government cannot be determined. But when one

considers the weight of the influence known to have been exercised by the general staff upon every detail pertaining to military affairs of the nation and the further fact that the emperor, the great "war lord," was not only in direct command and control of every function of the general staff, great or small, and was as well the almost absolute authority of the nation, it seems that the general staff, as a body, cannot escape responsibility for many of the neglects and failures and oversights in preparation for and conduct of the war mentioned by the author.

Even the brief outline of the contents of this book given by the reviewer indicate clearly its great value to any thoughtful reader having an interest in the subjects touched upon by the writer and more especially to those charged with oversight, in any country, of the procurement of raw material and manufacture and improvement of supplies and appliances of all kinds required for military purposes in peace and in war.

A translation of the most salient points of the work given by the reviewer, are here given. Citations from the text of the book are given in quotation marks.

"The treaty of Versailles has excluded Germany from all cooperation in development of war technique of the present. It is, therefore, of greatest importance for us to be acquainted with the development, in this direction, that is being promoted and stimulated by other powers with all their utmost resources." It is difficult for us to obtain this information and we greet, with warm welcome, a book so singularly adapted for furnishing opportunity for acquiring this knowledge.

When we let page after page, paragraph after paragraph of this work pass in review before us we are reminded of the saying of the poet: "*hic est aut nusquam quod quaerimus.*" Verily, "*quaerimus?*" But it is a most remarkable and singular feature of the otherwise so sane psyche of our people that many of its members (and among them not all the worst) would not only themselves avoid all close contact with technique, even though they give full value to possession of personal and military adaptability and knowledge in all other respects except technical professional questions.

It is the aim of this work to bridge over between the present and the time when Germany shall again emerge on an equality with other powers in war technique. To make this purpose evident the reviewer gives citation of sentences from the work itself. "Technical discoveries have the peculiarity that they penetrate only very slowly into the essence of the armies of nations. This may be accounted for by the fact that they at first manifest themselves for a time in very imperfect form only. But that is in itself proof of the fact that existing forms are in need of improvement and not that the thought underlying the discovery is wrong. What endless time was required for the fire-arm weapon to assert and establish itself in the science of war? How long were not those who first made use of this weapon, which was once 'modern,' defamed, derided, and accused of taking cowardly advantage of sinister and cunning trickery by those who had not been equipped with it? And what painful experiences did not those undergo who were opposed to it until they were obliged to yield and admit the progress of technique involved? Before the armored knight of old could draw his broadsword he was knocked over by the then 'modern army technique' and his maledictions of 'treason and cunning deceit' were of no avail: only adaptation to conditions and marching along with the procession succeeded."

Every country furnishes a repetition of this picture and we may well ask, as does the author: "when will technique be given the place becoming to it in army affairs?" Valuation of technique and of the forces inherent in it met with its most unhappy experience in Germany—in the land, in reality, in which technical successes had acquired their most tremendous range. Let us take only one—but a most prominent instance of this—our heavy artillery before the war. Whoever can look back upon even a medium period of

service only must admit that the lot of the ante-war heavy artillerist was not a happy one and cooperation with their efforts for improvements in the years preceding the war were only grudgingly given by their comrades of other arms. One or another may yet remember the heated struggles that had to be undergone to secure only a modest increase and improvement from the spring of 1911 up to the outbreak of the war, when those improvements had not yet been wholly completed. But our opponents in the struggle are our best witnesses of whatever success the heavy artillery had in its efforts for recognition before the war.

Effect of the instances cited is not to be taken as an indication that technique alone has been decisive. The impelling motif of technique is given expression by the key word; *rendering service*. But it cannot render service to him who wants to know nothing about it. If he does not take advantage of its offer he suffers the consequence and must yield to every opponent of equal value, who knows how to make technique serve his purposes. The author gives a striking example of this also: "The promotion of German aviation was given its first impulse by the greater encouragement of airships, but heavier-than-air craft was thereby set back. Germany was superior, at outbreak of the war, in airships and France in airplanes. Which of these was to prove most valuable as a war appliance could be determined only by the war itself; at its beginning both were regarded as means for securing information only; when the plane proved to be better for fighting purposes France's ascendancy in this direction became apparent.

Not only the composition and equipment of our ante-war army gave indications of deficiencies; we had also been guilty of shortcomings in the fundamental technical requirements of the army; the security of supplies of raw material; changes required for preparing general utility factories to take up manufacture of war material were neglected. "To this was added a still greater error. One had not even given thought to securing continuation of the work of factories for peace requirements." One cannot today deem it possible but it is nevertheless a fact that many factories whose continuation of the work of production was absolutely indispensable for war purposes were robbed of the greater portion of their trained expert working forces and were thereby practically paralyzed. That was certainly bad enough but worse still was the fact that army research, investigating, and testing boards, as for instance the artillery testing commission, the rifle testing commission, and other similar bodies, practically ceased to function after mobilization by reason of withdrawal of their personnel to other duties. This sounds unbelievable but it is a fact and a bitter reality. The author's work shows how army and nation suffered from and endeavored to neutralize such neglects and oversights and brings them clearly to the attention of the reader.

The war furnishes from out of its own necessities, numerous new manifestations of requirements for war technical appliances and gave opportunity, by stimulating the acute perception and far sightedness of every soldier, for testing his capacity for correct judgment. But judgment presupposes possession of knowledge; otherwise it runs the risk of descending to the domain of preconceived prejudice or bias. Every detail of the author's work may be regarded as a small cabinet filled with useful information. Everything is handled in a brief but suprisingly literal and careful manner and mention is made of things of which one nowadays hears much but knows little. One receives from this book, for the first time, in condensed form, notation of all that is wanting to us and perceives, with shocking clearness how endless are our deficiencies.

It is evident that such a book is not entertaining reading but it would be equally out of place to regard it only as a work of reference that is taken up for information on a definite subject only. On the contrary, it is to be read again and again, not here and there by separate chapters, but it must be studied as a whole because in that way only can the reader form a clear conception of and distinction between the relative dependence of separate fighting means upon each other and of their mutual limitations.—G. R.

Breaking Down 18-pdr. Schrapnel

By COLONEL DR. M. KOSTEVITCH

1. Unbox rounds and examine same to see—
 - a. That safety clip is in place; if not, one must be fitted before round is passed for unloading process.
 - b. That fuze is in good order and set at "Safety." Fuzes not set at "Safety" should be set in this position if possible by special examiner (Inspection and Safety Department of Factory) only and not by workman; if not possible without using force, the round should be unfuzed with extreme care in special cubicle by examiner only.
2. Remove fuze cover and pack same. Keep the various materials, *e. g.*, brass, tin, rubber, etc, separate.
3. Remove cartridge case (c. c.) with lever provided. Empty propellant and place in special wooden box with lid; any propellant spilled must be immediately swept up, using soft brush and special wooden shovel, and placed in receptacle. Send propellant for burning if there is no other order (order must be signed by Chief Safety Inspector).
4. Remove safety clips by means of tool provided; identify the different metals by using a file, and pack separately.
5. Pass C. C. to have primers removed (special shop):
 - a. By means of tool provided, sending primers to be fired in special shed (see special rules).
 - b. By means of press, if available, which crushes the case, and fires and removes primer (special rules).
6. Remove grub screws. Apply a small quantity of paraffin to head of screw before attempting to remove. Remove screws by means of small vertical drilling machine, the action of which has been reversed, fitted with clutch screwdriver. If drilling machine is not available, remove with ordinary hand screwdriver. If grub screws do not come out, apply more paraffin and allow to soak for some time and try again. Do not use force and spoil the slot in screw before trying this method. When grub screws holding fuze in shell cannot be removed, one of the following methods should be adopted (inside of special compartment):
 - a. Drill through grub screw, using sensitive drilling machine—workman to be outside of cubicle and fully protected while doing this operation—case of possible explosion, though very rare. The size of twist drill to be used is $\frac{1}{8}$ ", and this should be fitted with a stop to allow $\frac{1}{4}$ " only of the drill to be used (automatic device). When grub screw has been drilled out, remove fuze as per special rules.
 - b. Grip shell in vise in cubicle and grip bushing of shell with large size Stillson wrench. Remove bushing and fuze together.

When fuze cannot be removed after extracting grub screw: carefully remove fuze cap, time pellet, and powder rings and grip body of fuze with Stillson wrench. Remove fuze. This operation may only be performed by a specially trained operator, must be done in a quite separate cubicle and under direct supervision of Danger Building Officer.

NOTE.—Sometimes shells have been found with bursting charge of black

pellets; in this case, after the fuze has been removed, place shell over steam jet made of $\frac{1}{8}$ " tube of sufficient length to allow tube to reach to the inside of tin cup; allow shell to remain on jet until powder is removed—30 seconds should be long enough to do this. This operation obviously must be done in separate shop and in accordance with special rules.

7. Unfuze shell. Fix shell in vise and remove fuze by means of special tool provided. Operators must be fully protected while the operation of unfuzing is being performed and all unfuzing must be done from the outside of cubicle. Only one round will be allowed in a cubicle at any one time. After fuzes have been removed, place same carefully in a box and send to be broken down in a special shop as per Special Recovery Method.

8. Examine the shell to see that the shalloon disc covering central tube is in place; if not, a disc must be fitted over tube, using a little shellac.

9. Examine threads of bushing for black powder and remove any powder that may be present by brushing with a soft hair brush into a tin of water which must be stirred frequently. Any powder spilled on the tables must also be brushed into water. Pass shells to have powder removed.

Only occasionally will shells be found with a bursting charge of black powder pellets in the central tube which will be difficult to remove.

10. Remove new shalloon disc, without using fingers but with pointed wooden tool. Invert shell over bucket of water (special device) and rotate device with shells so that all powder will fall out of tin cup—the water should be stirred frequently. After all powder is removed, fill tube and cup with water and allow to stand for a few minutes, water being of 65-75 degrees Centigrade. Pour out water, wash again, and pour out water (this to be continued until water is clear without any black tone). Place a small wetted plug of cotton waste or tow in the central tube and pass the shell for debushing.

NOTE.—Before debushing the safety inspectors must very carefully see that there is really no trace of any grain of powder in tin cup.

11. Debush as follows:

- a. Hammer around the bushing at the junction of bushing and shell and slightly flatten bushing to take drift.
- b. Remove bushing by means of square tapered drift fitted to large vertical drill. Keep brass, steel, and cast iron bushings separate.

12. Remove bullets, resin, etc, as follows:

- a. Place the shell, nose downwards, in rotary hammer. Allow bullets and resin to drop on sloping sieve, $\frac{3}{8}$ " mesh; the bullets will run down into a box at end of sieve and resin will fall through sieve into boxes of another dimension. If no rotary hammer is available, pneumatic hammers or hammering vigorously by means of a 4-lb. hammer should be employed to remove bullets, using sieve as stated above.
- b. Remove central tube by unscrewing same; tin cup will then fall out of shell, and occasionally the steel disc also.

13. Examine tubes and take out wetted cotton waste or tow. Central tube must be thoroughly cleaned with a wooden rod while wet. Then pass tube as scrap. The cup must be placed in a bucket containing cold water and when the bucket is full of tin cups, a lid must be placed on the top and the bucket removed to the shed prior to being taken to the Burning Ground for burning out the last possible traces of black powder (dust or deteriorated grains; this measure is a very rational

one as has been shown in practice). On arrival at the Burning Ground the water must be poured off and the cups thrown on a fire. After the last traces of powder have been burnt out, the cups are removed as scrap to the stores. Keep brass, copper, and steel separate.

14. Deband shells by means of hammer and chisel and special tool for removing band. This work must be done in a quite separate shed and on no account where the breaking-down process is actually in process, that is, up to "debushing." (See Section 11).

15. It may be also allowed to "steam out" black powder from shrapnel; in this case the following rules are to be observed:

- a. The temperature of the steam must not exceed 110° C. and must be taken every twenty minutes by means of a glass thermometer in the jets both nearest to and farthest from the main pipe.
- b. Clean up the surface of each pipe as often as possible, removing any traces of powder by means of brush (hair), cotton rag, or tow, but not by metal tools, metal brush, etc.
- c. Every evening after work, and as often as possible during working hours, clean up any traces of powder that may be on the surface of the trough and ground and the connections of steaming-out plant.
- d. In this process, the use of a jet made of any metal other than brass or copper is strictly prohibited.
- e. The surface of the powder pellets in the central tube must be slightly wetted before being sent to the steaming-out plant.
- f. The tank with the powder solution must be cleaned as often as possible, but at least once every two days, and the contents removed to the Burning Ground and burned that evening.
- g. The tank is to be kept covered with a wooden lid at all times until its arrival at the Burning Ground.
- h. No knocking or friction is to be allowed and no metal tools at all will be even kept in this Plant.
- i. Only the shells being steamed out on the jets and enough shells for one relay (which must be kept 10 feet away from the jets) will be allowed in the steaming-out plant. All other shells must be kept outside and separated from the plant by an artificial mound in accordance with dimensions written by Chief Safety Inspector.

SPECIAL PRECAUTIONS

1. Under no circumstances must any undue force be used in the operations.
2. Filled components must always be handled with great care and must not be thrown about or dropped.
3. Rounds must never be carried by the tapes of safety clips.
4. Great care must be taken in dealing with black powder, and any powder spilled should be swept up with a soft hair brush and wooden special shovel and placed immediately in a tin of water, any water containing black powder should be stirred frequently.
5. All recovered metals should be carefully sorted out and sent to store, but carefully examined for traces of black powder before this is done—duty of Inspection and Safety Department of each factory under supervision and direct responsibility of Danger Buildings Officer of each factory. The last officer, being

absolutely independent of the Superintendent of the Factory, is directly responsible to the Chief Safety Inspector of the Headquarters of the Factories.

6. Hammering components containing any traces of black powder will not be permitted on any account.

7. Explosive Limits and Man Limits must not be exceeded.

8. Shells with bursting charge of black powder pellets must never be passed to have bullets, etc., removed until all pellets and grain powder have been completely removed.

9. The heads of shops will be responsible that these rules are thoroughly understood by all workers in shops and that the work is properly carried out. On the other hand, workers breaking any of these rules will be liable to instant dismissal.

10. The burning out the powder from tin cup after the removal of black powder pellets in the central tube is not recommended but may be done in case of emergency in accordance with special rules and in specially constructed cubicles.

TOOLS AND EQUIPMENT AUTHORIZED

Pliers for removing fuze covers. Sensitive drilling machine with clutch screw-driver of screwdrivers for removing grub screws. Paraffin oil for grub screws: no more than 0.25 gallon to be in shed at any one time. Vises in cubicles. Shellac varnish. Fuze keys or spindles. Tool for removing safety clip. Press for crushing cases (cartridge cases). Primer keys. Forked lever for cartridge cases or special jig. Selected boxes fitted with lids having rope hinges for propellant, fuzes, and primers. Boxes for other components. Soft hair brushes and wooden trays for sweeping up powder. Water buckets in cubicles for powder. Water buckets for holding powder emptied from shells. Wooden spatulas for water buckets. Wooden tools for removing shalloon discs. Machine for debushing. Rotating machinery. Pneumatic hammers or similar tools for removing bullets and resin. Vises and sieves for above. Hammers and chisels or pneumatic tools for debanding. "Tin opener" tools for above. Water tank for washing tubes and tin containers. Fire buckets. Chemical extinguishers. Copy of this recovery method. Copy of notice relating to fire, etc.

EXPLOSIVE LIMITS

Complete rounds waiting to be broken down	1000
Rounds or shells in progress through shed	2000
Fuzes	600
Primers	600
Boxes containing no more than 40 propellants	1
Rounds complete or partially broken down in cubicle	1
Propellants in cubicle	10
Primers in cubicle	10

MAN LIMIT

In each cubicle at any one time	1
In shed: figure to be fixed by Chief Safety Inspector and will depend on local conditions and construction of shed.	

The Awakening Americas

A prediction that within the next ten years greater development will take place in Latin America than has been brought about since the Spanish Conquest was made at the foreign commerce session of the Chamber of Commerce of the United States by Victor M. Cutter, President of the United Fruit Company.

"We business men," said Mr. Cutter, "know that from an economic point of view imperialism is a failure. Trade does not follow political boundaries, but is governed by economic needs. The United States government has repeatedly stated that its aims are not imperialistic, and it is certain that the people of this great country have no designs upon their neighbors to the south. There should be no economic invasion as part of the policy of any government, north or south. Each government should give all possible statistical and other aid to its business men, but enterprise should be left to private initiative. There must be mutual respect for international law and its corollary, the protection of property and lives of citizens of each country in every other country.

"Contrary to the alleged popular impression, there is no exploitation today nor are there monopolistic concessions anywhere in Latin America. Numberless statements have been made on this subject, but never have evidence and facts been presented or proof furnished.

"All of these hindrances must be totally disregarded for the reason that proofs are already available as to their absurdity. In spite of all the talk and political bunk about these difficulties trade has vastly increased; which means that capital—which is the shyest thing on earth—has been and is being invested in increasing amounts."

Taxes Show Staggering Figures

The cost of all government in the United States is enormous. It is 11½ billion dollars—nearly one-sixth of the entire annual income of the country.

This cost is not only enormous but is growing. In 1925, government cost more than twelve times as much as in 1890. The increased cost of government in these thirty-five years outstripped the growth of population by more than seven to one. In 1925, we spent for government nearly half the value of our railroads.

In the five years ending with 1925, the cost of running the federal government was decreased by one-third. But at the same time the cost of running the state and local governments more than doubled.

The greatest single item in the cost of government is the public payroll. So many people are now supported by the government that for every ten people employed in other than government work, there is one person supported by the government.

During the past five years our state and local governments have put us deeper into debt at the rate of \$3,300,000 a day. During 1925, this rate was increased to \$3,800,000 a day—more than ten times as much as it was twenty-five years ago.

We are finding it hard now to pay only the interest on these immense debts our state and local governments are piling on us. What are we going to do when the time comes to pay off the mortgage?—*Everyman's Almanac*.

The Invisible Slaves

China has four times as many people as the United States, but the United States has the equivalent of ten times the number of effective workers found in China.

In an article in the *Atlantic Monthly*, Thomas T. Read lays down the principle that the only way to have material things is to work. Then he subjects this principle to further subdivision as follows:

First, work must be done to avoid repetition, as piping water from the spring instead of continuously carrying it.

Second, work must be analyzed to do away with false motion.

His third and last conclusion is that the worker must be multiplied by machinery.

The comparative output of work per person in various countries varies as follows: China, 1; India, $1\frac{1}{4}$; Russia, $2\frac{1}{2}$; France, $8\frac{1}{4}$; Germany, 12; Great Britain, 18; Canada, 20; United States, 30.

Although the average wage is high in America, the average cost of work is low. It takes the European workman approximately ten times as long to make an automobile as it takes the workman in our country, because of the highly efficient machinery and vast quantity of power which are the invisible slaves of our workmen.

APHORISME XLVII

Upon certaine notice of some treasonable plot or practise in an Army, the Generall must first assure the place, and then more fully search into the treason, and punish the traitors, either all for the offence; or the ringleaders for example. Severity in this case is but justice, lenity puts all in hazard; wherefore against such intestine ambush, we must first take up the Buckler of safety, and then produce the Sword of Justice.—Ward's Animadversions of War (London, 1639).

COAST ARTILLERY BOARD NOTES

Communications relating to the development or improvement in methods or materiel for the Coast Artillery will be welcome from any member of the Corps or of the Service at large. These communications, with models or drawings of devices proposed, may be sent direct to the Coast Artillery Board, Fort Monroe, Virginia; and will receive careful consideration. R. S. ABERNETHY, Colonel, Coast Artillery Corps, President Coast Artillery Board.

New Projects Received and Initiated During the Month

Project No. 589, Nomograms for Differential Effects.—Nomograms of the differential effects, prepared by the Ordnance Ballistic Theory Section, have been studied by the Coast Artillery Board. The chief use of such nomograms in the Coast Artillery would be in the computation of firing data for mobile long-range guns firing at fixed land targets. The use of nomograms of this type in fixed seacoast batteries would not be practical in view of the fact that the firing will be against moving naval targets where the differential effects may change rapidly with the change in range and direction of the target's course. The Coast Artillery Board is of the opinion that the necessity for nomograms of the differential effects for Artillery service is not sufficient at this time to warrant their preparation and publication for general use.

Project No. 590, Test of Chevrolet Cross Country Car for Sound Ranging Battery.—One Chevrolet cross-country car is being shipped to the Commanding Officer, 1st Sound Ranging Battery, for test by that organization to determine its suitability for reconnaissance and other work incident to the field service of the sound ranging service.

Completed Project

Project No. 526, Test of Fire Control Cars and Equipment

I—HISTORY OF THE PROJECT.

1. In Coast Artillery Board Project No. 440, there was considered the modification of ammunition cars for use as fire control cars for railway artillery. The following extracts are quoted from the indorsements to the report of that project:

665/CB-3

9th Ind.

War Department, OCCA, January 17, 1927.—To President, Coast Artillery Board, Ft. Monroe, Va. (Through Commandant, C. A. School).

1. Two railway ammunition cars modified as indicated in this correspondence will be turned over to the 52d Coast Artillery in the near future for test under supervision of the Coast Artillery Board as indicated in your Project No. 440. . . .

2. It is desired that you take the necessary action to arrange and equip these cars as outlined in Project No. 440 in so far as available equipment will permit, so that test may be conducted during the coming outdoor training season.

3. *a.* Reference the equipment listed in paragraph 5, Project No. 440, it is expected that one each of the following will be available by April 1, either at Fort Monroe or at Fort Eustis:

Range Correction Board T-1.

Stephens Predictor

Deflection Board T-1, Universal

T. I. Apparatus for mobile artillery.

b. Reference radio set SCR-136, this set will not be available in time for use in this project.

4. In this connection attention is invited to your 2d Indorsement, Project No. 440, May 29, 1926. The opinion expressed therein as to flexibility in the arrangement of equipment is concurred in.

Project No. 526 x 440

10th Ind.

Coast Artillery Board, Fort Monroe, Va., February 28, 1927.—To the Chief of Coast Artillery, Through Commandant, C. A. School, Fort Monroe, Va.

1. Necessary arrangements have been made to arrange and equip the cars as directed in paragraph 2, 9th Indorsement, upon the receipt of the material mentioned in paragraph 3 a. Improvised material will be used in case of delayed deliveries.

2. The necessary details have been arranged so that orders may issue for participation of the 52d Coast Artillery (Ry) in accordance with program outlined below.

3. The Coast Artillery Board concurs in the recommendations of the Commanding Officers, Fort Eustis and 52d Coast Artillery (Ry) that no formal program be laid down, but:

a. That test consist of use of cars and material by Battery E, 52d Coast Artillery (Ry) during its outdoor season drills and practices for 1927.

b. That test include use of a single car for both fire control and battery commander's station.

c. That test for railway mortar battery be made by a mortar battery of the 52d C. A. (Ry) during its demonstration firing for the Coast Artillery School after regular practice of the regiment is completed.

4. The Coast Artillery Board recommends further:

a. That the tests by Battery E, 52d Coast Artillery (Ry) include night drills with the aid of aircraft, to determine:

- (1) Adequacy of illumination.
- (2) Power required for illumination.
- (3) Visibility of illuminated cars from aircraft.

b. That the Coast Artillery Board be given advance notice as to phases of test, particularly of night tests and practice firings.

c. That at conclusion of tests the following reports be rendered to the Coast Artillery Board through local military channels:

(1) General history of tests with description of various arrangements tried and of arrangement found most suitable, with diagrams.

(2) Report of night test under headings given in sub-paragraph 4 a.

(3) Suitability and sufficiency under conditions in the field, particularly as distinguished from conditions at or in the vicinity of a harbor defense or post and vicinity, of a single car for both fire control and battery commander's station.

(4) Spotting methods and devices used, and results.

(5) Suitability and usefulness of firing board (Drawing Board 50"x 70" on trestles).

(6) General results.

(7) General suitability and convenience of:

(a) The cars as modified.

(b) Ventilation, heating and lighting arrangements.

(c) Storage facilities particularly as to securing of apparatus while in transit.

(8) Comments and recommendations.

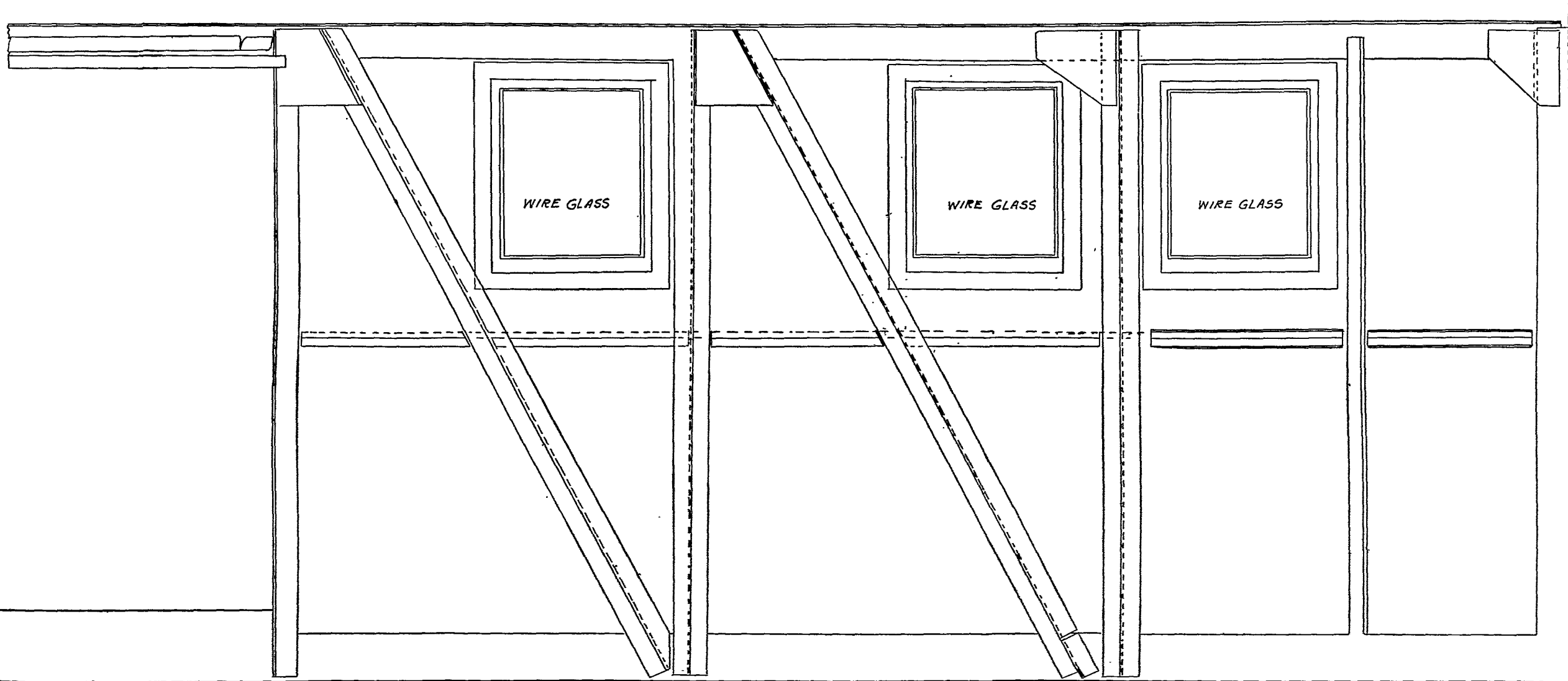


DIAGRAM
MADE FROM
ORDNANCE SKETCH NO. 251
EXHIBIT 'A'
PROJ. 526

5. The Coast Artillery Board further recommends that in carrying out this program service tests be made of the arsenal design of the instruments named below and separate report on each appended:

Range Correction Board T-1
 Stephens Predictor
 Deflection Correction Board T-1, Universal
 T. I. Apparatus for Mobile Artillery
 Angular Travel Device (in Case II only, if practicable)
 Fire Adjustment Board.

It would be preferable to have service tests of all these instruments (Angular Travel Device excepted) made with the cars by both gun and mortar batteries.

665/CB-3

11th Ind.

War Department, OCCA, March 3, 1927.—To the Adjutant General (Through Chief of Ordnance).

1. It is desired that the recently modified fire control cars now at Fort Eustis, Va., be given a service test under the supervision of the Coast Artillery Board.

2. It is recommended that the service test as outlined in the preceding 10th Indorsement be approved and that the 52d Coast Artillery (Ry) at Fort Eustis, Va., be directed to carry out the program indicated in that indorsement, under the general supervision of the Coast Artillery Board, subject to such minor modifications as may be required by local conditions.

AG 453 (3-25-26) Misc-D

13th Ind.

War Department, AGO, March 18, 1927.—To the Commanding General, Third Corps Area.

Directing a service test of ammunition cars modified for use as fire control cars, as recommended in 11th and 12th Indorsements.

2. Tests of separate pieces of fire control apparatus have been reported upon as indicated:

Range Correction Board, T-1	Project No. 588
Stephens Predictor	Project No. 547
Deflection Board T-1, Universal	Project No. 549
T. I. Apparatus for Mobile Artillery	Project No. 308
Angular Travel Device	Project No. 483
Fire Adjustment Board	Project No. 502

II—DISCUSSION.

3. *a.* Two ammunition cars were modified at Fort Eustis as follows:

(1) *Illumination.* Twelve windows were installed as shown in Ordnance Sketch No. 251. A diagram made from this sketch is shown in Figure 1. Folding doors fitted with wire glass were installed in the side doorways. A sliding door fitted with wire glass was installed in one end doorway. The sliding steel doors were not removed. Seven electric light sockets were installed along the center line of the ceiling. A photograph of one of the cars is shown in Figure 2.

(2) *Heating.* A small stove was installed in one corner, with stove pipe projecting through car roof.

(3) *Floor.* Floor was covered with linoleum.

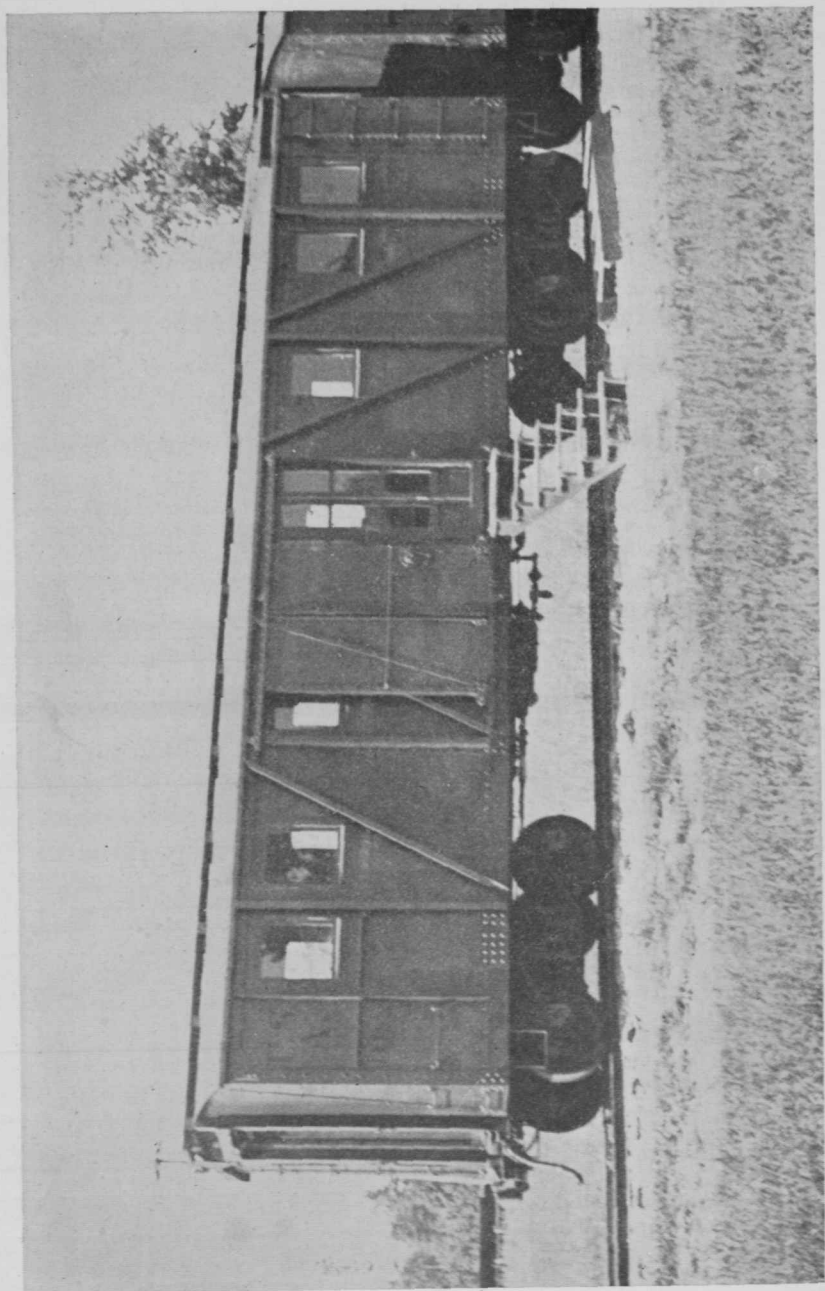


FIG. 2

(4) *Ceiling.* A wooden ceiling was installed.

(5) *Painting.* Lower parts of walls were painted a neutral gray. Upper parts of walls and the ceiling were painted white.

(6) *Provision for storage of material.* A cabinet was installed across one end of the car. This is shown in Figure 3.

b. Two additional ammunition cars were modified for use as fire control cars. The modification of these cars differed from the modification of the first two only in that no means of heating has been provided (it is understood that a small stove will be installed near the center of each car). The cabinets installed in these cars are much smaller than the cabinets installed in the first cars. The cabinet end of one of the cars is shown in Figure 4.

4. The first two cars modified were tested by the 52d Coast Artillery (Ry). The additional two cars were not completed in time for test. All four cars are at present in regular use by the 52d Coast Artillery.

5. Report of the Commanding Officer, 52d Coast Artillery (Ry) is as follows:

1. The following report is rendered with respect to test of Fire Control Cars during the current target practice season of this regiment.

a. The primary tests were conducted by Battery "E" (8-inch guns). After the use of both cars, one as F. C. and one as B. C., was sufficiently tested, one car was turned over to Battery "F."

b. Each car was used during service practice as a combined F. C., B. C., and spotting car.

c. No test was made by a mortar battery for the reason that both gun batteries fired a demonstration practice for the C. A. School and the use of the cars would have been in no respect different if turned over to the one mortar battery which fired for the school.

NOTE.—The two cars were wired uniformly so that they could be used interchangeably as F. C. and B. C. cars.

2. a. Aircraft has not been available for work in conjunction with our training subsequent to May 20, and no night tests were conducted using aircraft. However, it was determined that

(1) The illumination was adequate.

(2) Power for illumination was used in the tests furnished alternately from a salvaged Winton set and from a Universal Motor. Recommendation has been made heretofore that a Universal Motor, 4 K. W., be furnished for each battalion for combined use as a charging set and power unit.

(3) There should be no difficulty in improvising shades for the windows to prevent visibility of illuminated cars from aircraft. By limiting ingress and egress to one end door, a canopy could probably be arranged to prevent visibility.

b. A member of the Coast Artillery Board was present from time to time during the test.

c. (1) Memoranda by battery commanders showing arrangements by diagrams and recommending minor changes are attached hereto.

(2) Night tests consisted only in the use of cars at night while the officers were preparing target practice reports.

(3) The single car is suitable for both fire control and battery commander's station. This particular car is a little short; however, assuming that a longer car is not available for conversion into F. C. and B. C. car, it is recommended that the ammunition car type be adopted as modified for this test.

(4) Each battery used an additional Cloke Plotting Board for spotting purposes. Results were generally satisfactory and reliable.

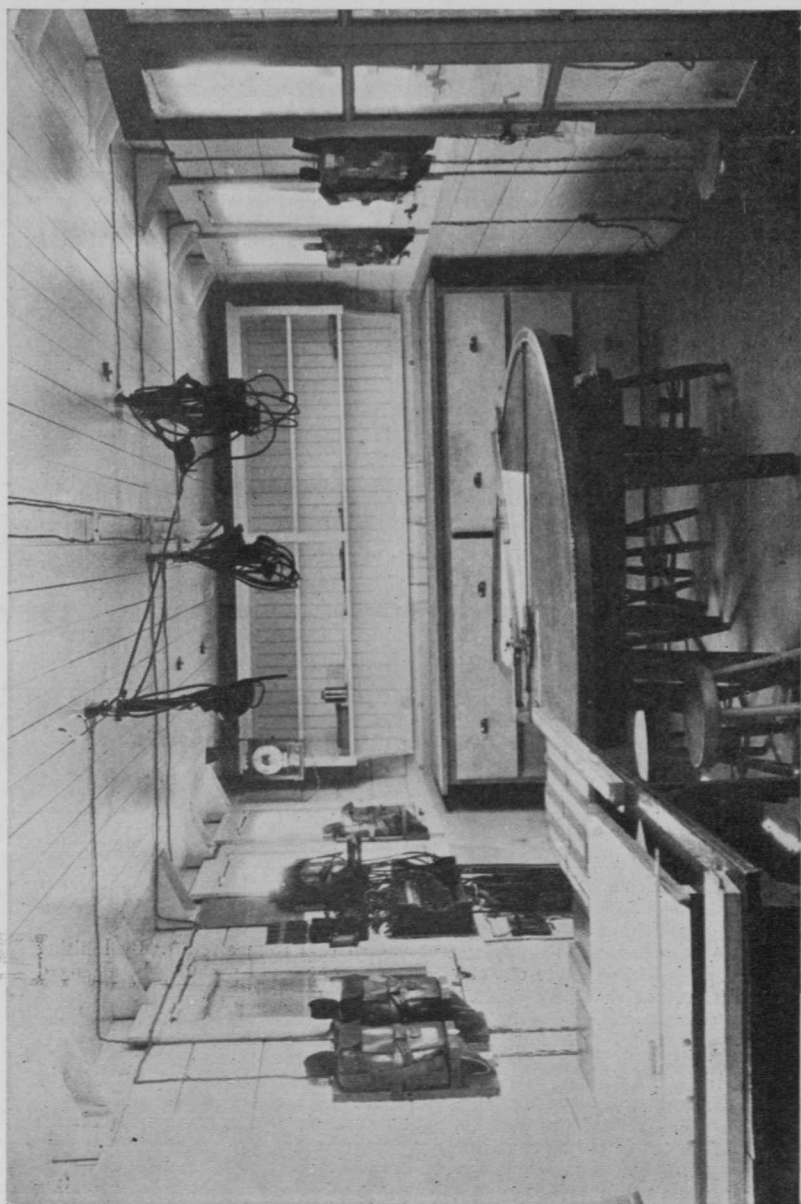


FIG. 3

(5) The only firing board used by battery commanders consisted of an impact chart on a suitable table. This was improvised. There would not be room in the car for a Drawing Board 50"x 70" on trestles, in addition to the other apparatus used. It should be noted that in the latest modification, the map case hinged to the wall provides a board 35"x 51".

(6) In general, the test proved the suitability of the car for the purpose designed. Attention is invited to certain minor changes effected in the conversion of the two additional cars referred to below.

(7) (a) The cars as modified are cooler on account of the overhead ceiling installed; this is an important item in a small all-steel car. The floor covering provided is a decided advantage in deadening the sound of footsteps. The cabinet and map case provided in the second two cars to be modified are preferred to the one large cabinet first constructed. More room is thus available in this end of the car and access is had through this end door.

(b) Ventilation and lighting are satisfactory. Heating by a stove cannot be made ideal, but no better method is suggested. In my opinion, the stove should be located near the center of the car, rather than at one end.

(c) Apparatus which is not secured to the walls of the car should be taken down and secured from shifting about. There is ample room in the car for this purpose.

(8) There may be situations in the field when it would be desirable to have a separate F. C. car for the battery commander. It is believed that such occasions will be rare and not of sufficient necessity to justify adding an additional car to the train. In semi-permanent situations probably more concealment and protection would be sought than a car would afford. In temporary shifting situations, trackage, motive power, and cover will dictate a minimum number of cars.

3. Separate reports have been forwarded direct to the Coast Artillery Board covering tests made of the following instruments:

Range Correction Board T-1

Stephens Predictor

Deflection Correction Board T-1, Universal

T. I. Apparatus for Mobile Artillery.

NOTE.—Figure 5 shows location of telephones and switchboard.

6. Report of the Commanding Officer, Battery "E," 52d Coast Artillery, is as follows:

1. In compliance with instructions, two remodeled fire control cars were tested by this battery during the 1927 target practice season. The cars furnished were tested as fire control and as B. C. cars in subcaliber practice and as a combined fire control, B. C., and spotting car in service practice.

2. In general, the modified car is a big improvement over the standard ammunition car for fire control purposes. A diagram showing the arrangement of fire control apparatus with the car used as a combined fire control, B. C., and spotting car is inclosed. The present position of the stove is unsatisfactory. It is impossible to arrange the plotting board so that either the arm setters or the assistant plotter will not be too close to the stove for comfort. The stove should be moved to the position indicated by the dotted square on the diagram. As installed, the windows leaked badly. Window strippings would obviate this. In wet weather the doors stick and are hard to open due to warping. The car should be made gas proof, and a blower installed for ventilating purposes at night or during a gas attack. The windows have no arrangement to conceal lights at night. Each window should have an outside cover installed. The cabinet is larger than necessary, and takes up too much room. It is recommended that a map case hinged to the wall, overall dimensions 51"x 35"x 7" and a movable foot locker 12"x 12"x 36" which could be placed out of the way under a plotting board or table,

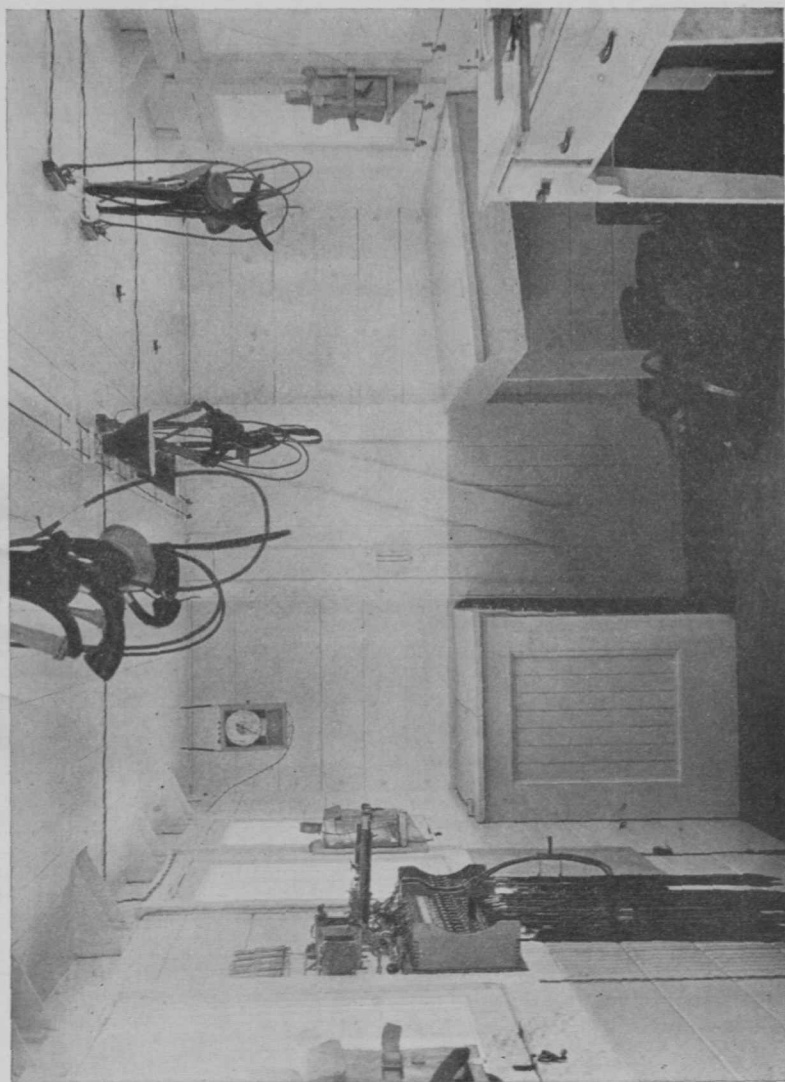
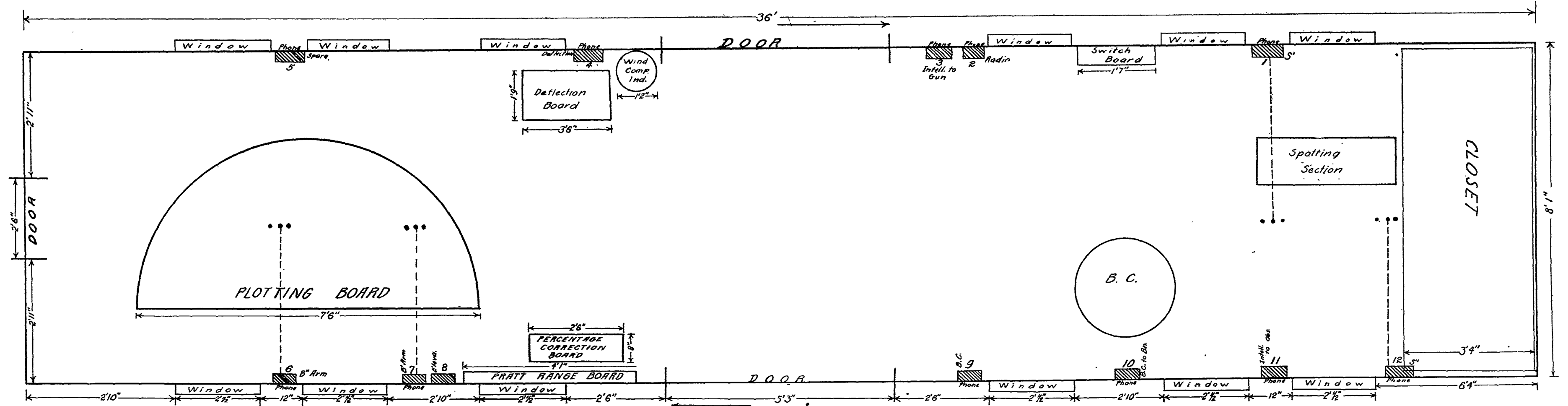


FIG. 4

~ PLOTTING CAR - 52nd C.A.(RY.)



Heighth of Car Inside - 6' 8"
 Heighth from Floor to Window - 3' 5"
 Heighth of Windows - 3' 1"
 Scale: 3/4 inch = 1 Foot

W.G.M., M.G.

be substituted for the present cabinet. This would allow space for a door at the end of the car. Some officers of the regiment prefer a movable cabinet 29"x 39"x 37" with three drawers 3" deep, and an 18" compartment at the bottom, to the foot locker. Either one is preferable to the present cabinet. With these exceptions the car is satisfactory.

3. As a fire control car, with the exceptions noted above, the car leaves little to be desired. The lighting is excellent and ample space is available for the plotting section.

4. As a battery commander's car it is also satisfactory, but is more elaborate than necessary. It is desirable that each battery have a car available for administration, for use as a message center, radio, etc., but a standard ammunition car with a cabinet will answer the purpose just as well. An officer directing fire would need only a map and an impact chart. Sufficient light is available for this without alteration, other than the installation of glass inside doors. It was found that when fire adjustment was conducted from a separate plotting car, plotting and spotting being handled in the other, that three additional telephone men were necessary, more time was needed for the transmission of deviations and corrections, and more chances of errors introduced than when adjustment was conducted from the same car with the plotting and spotting section.

5. The use of the car as a combined fire control, spotting, and B. C. car is believed to be the most satisfactory of any. By "B. C." it is not meant that the battery commander in person should be present, but that the officer making the adjustment, if posted where the deviations can be reported without the use of a telephone, and where he can announce corrections direct to the operators, and can be in direct touch with the plotter, has his problem of adjustment simplified and speeded up. As a combined car, the personnel was cramped, the car not being long enough. A standard day coach with the seats removed would answer the purpose very well.

NOTE.—Diagram submitted is shown in Figure 6.

7. Report of the Commanding Officer, Battery "F," 52d Coast Artillery, is as follows:

1. In compliance with instructions, a remodeled fire control car was tested by this battery during the 1927 target practice season. The car was tested as a combined fire control, B. C., and spotting car both in sub-caliber and service practice.

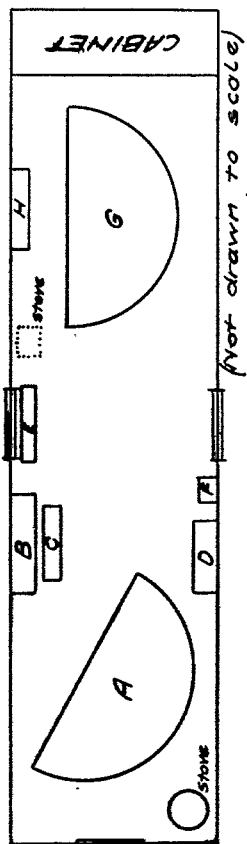
2. In general the modified car tested by this battery is a great improvement over the standard ammunition car used for fire control purposes. The chief objections to the modified car are: (1) The cabinet as now installed is too large, therefore taking up too much space; (2) there is no screening whatever on the car which makes it impracticable to use the car at night in the summer—this was tried out while the regiment was in camp during May, 1927; (3) The windows as now installed are not weather stripped, nor are the folding inside doors, which allows rain to come into the car; (4) There is no arrangement to conceal light at night; (5) There is no protection from a gas attack; and (6) With both plotting and spotting sections in the car it is too crowded, the car not being long enough.

3. With the present arrangement of windows the lighting of the car is excellent. The electric lights now installed give sufficient light for night work.

4. A sketch showing the arrangement of equipment as used by this battery is appended and it is believed this arrangement is very satisfactory when the car is used as a combined B. C., fire control, and spotting car, excepting the fact that the car is not long enough.

NOTE.—Diagram submitted is shown in Figure 7.

8. The Coast Artillery Board concurs in the report quoted in Paragraph 5.



LEGEND

- A- Plotting Board
- B- Bange Board
- C- Percentage Corrector
- D- Deflection Board
- E- B.C. Impact Chart
- F- Wind Component Indicator
- G- Spotting Board
- H- Monocord Switchboard

EXHIBIT "F"
PROJ. 526

III—CONCLUSIONS.

9. The Coast Artillery Board is of the opinion:

a. That the four fire control cars developed by the modification of ammunition cars are satisfactory, with the minor exceptions:

(1) Lack of means, such as weather stripping, of making the windows and doors weatherproof.

(2) Lack of means of preventing light from emanating at night.

(3) Lack of window screens.

b. That the smaller cabinet, as provided in the second two cars is preferable to the larger as provided in the first two cars.

c. That the best location for the stove is near the center of the car.

d. That one car is sufficient for the purposes of both a fire control car and a battery commander's car for a battery.

e. That the arrangement of fire control apparatus within the fire control car should be at the discretion of the battery commander.

f. That, in case of necessity, satisfactory fire control cars can be made by the modification of standard railway baggage or box cars.

IV—RECOMMENDATIONS.

10. The Coast Artillery Board recommends:

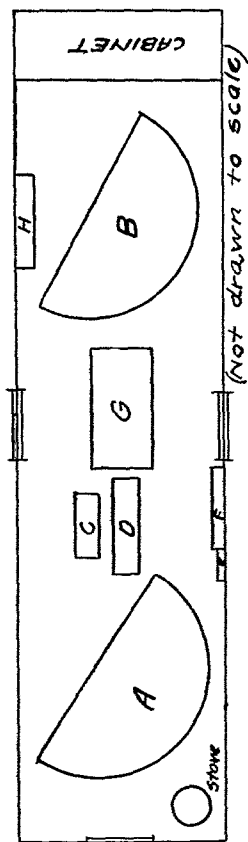
a. That steps be taken to weatherproof the doors and windows of the four fire control cars at Fort Eustis, to provide the windows with shades that will prevent the emanation of light at night, and to screen the windows.

b. That the modification as applied to the second two fire control cars at Fort Eustis, and including weatherproofing, shading, and screening of windows, be adopted as a standard for the conversion of standard ammunition cars to fire control cars.

V—ACTION BY THE CHIEF OF COAST ARTILLERY.

1. Except for paragraph 9 *d* the conclusions and recommendations of the Coast Artillery Board, as presented in paragraphs 9 and 10 of Project No. 526, are concurred in.

2. In concurring in the recommendation for standardization, contained in paragraph 10 *b*, it is understood to apply only to the method of modifying the present standard ammunition cars for use as fire control cars. This is not intended to exclude the future modification for standard fire control cars of a more suitable type of car than those now on hand.



LEGEND

- A. Plotting Board
- B. Spotting Board
- C. Percentage Corrector
- D. Deflection Board
- E. Wind Component Indicator
- F. Range Board
- G. B.C. Impact Charts
- H. Switchboard

EXHIBIT "G"
PROJ. 526

BOOK REVIEWS

A Greater than Napoleon: Scipio Africanus. By Captain B. H. Liddell Hart. Little Brown and Co. 1927. "Octavo." 290 pp. \$3.50.

Captain Hart is a vigorous critic of the modern practice of war, as exemplified in 1914-1918. In his own phrase he is a "military heretic who questions the doctrine of Clausewitz that the enemy's main army is the primary military objective." For this objective he would substitute the morale of the civil population, "the seat of the hostile will." Translated into modern terms, this means warfare of propaganda and of ruthless surprise attacks on noncombatants by submarine, tank, and air force. Incidentally, the attack on morale is to cover enemy combatants also, using propaganda and the principle of surprise.

Cutting away still more from orthodoxy, Captain Hart is a strong advocate of the "mechanicalization" of war. The submarine under the water and the airplane in the air should, he thinks, be matched on land by forces in which the human element simply guides and fights the machine. And this leads him to criticize the stabilized warfare of 1914-1918 and to expound anew the principles of maneuver and surprise. But he goes far beyond the orthodox conception of those principles and says, in noting "how consistently Scipio executes a convergent assault" (double envelopment), that "his appreciation of this, the essential formula of tactics, contrasts with its rarity in ancient warfare, in modern also, for how often do commanders wreck their plan either on the Scylla of a divided objective or on the Charybdis of a feint or "holding" attack to divert the enemy's attention and reserves from their main blow."

In his book, *Paris, or the Future of War*, published in 1925, he states his theses clearly and projects them into the future. In *Scipio Africanus* he attempts to use the life of that great Roman general as an example to illustrate his theories in strategy, tactics, and armament.

Military men will find in this modern biography of an ancient general a well written and interesting account of his remarkable campaigns. The author's rather radical ideas on warfare may be taken as excellent stimuli, if nothing more. But, to say the least, the use of Scipio's campaigns to bring out these ideas is somewhat far-fetched, for what is known of Scipio comes entirely from his own side. There are no enemy, or even neutral, accounts by which one can check the story. (Polybius, a Greek, wrote from Roman sources.) Nor are the pro-Roman accounts in any way complete or exact. On so vague a background it is easy to build almost any theory; but the deductions drawn from it cannot be convincing.

Furthermore, Captain Hart overlooks entirely a fundamental factor. When Scipio's campaigns began, the war had been going on for eight years, and for seven and a half Hannibal had been in Italy. Carthage, a nation of traders possessed of only one outstanding genius, had lost control of the sea, and her military organization and spirit were cracking everywhere. The hopeless inaptitude of the Carthaginians, except under Hannibal, is apparent throughout Captain Hart's narrative, though he would have us believe that Scipio's extraordinary exploits are attributable solely to his genius. For example, at Ilipa, of which Hart writes

that "military history contains no more classic example of generalship than this battle," Scipio with 48,000 men defeated Hasdrubal with 74,000 (and 32 elephants). He did it by an unusually complicated form of double envelopment. So inert was Hasdrubal that he was unable to alter his defective battle-order even though Scipio, "to let his hungry opponents feel the effects of their lost breakfast," gave him "some hours" respite before making his attack. It does not seem to occur to Captain Hart that Hasdrubal's inability to change his dispositions at Ilipa contrast significantly with Scipio's action in the crisis of the battle at Zama, when "in the face of an enemy hardly more than a bow-shot distant he not only reorganized his troops but reconstructed his dispositions." It would appear that before reaching Ilipa the Carthaginians had lost something of far more importance than their breakfasts.

Nor was Scipio alone in finding the Carthaginians in Spain incompetent, as is clearly indicated by the ease with which his lieutenant, Silanus, surprised and routed the forces of Hanno and Mago.

In the African campaign the same inefficiency of the Carthaginian troops is apparent, even at Zana itself. The outstanding example is Scipio's exploit in destroying Hasdrubal's and Syphax's forces by the elementary method of burning their camps at night and slaughtering the men as they came out. Hart, quoting Polybius, says: "Of all brilliant exploits performed by Scipio this seems to me the most brilliant and most adventurous." Adventurous, yes: brilliant in conception, perhaps, though its true worth lies in Scipio's correct estimate of his enemies as being supinely incompetent.

Leaving aside the unquestionable genius of Scipio, as well as his rather questionable superiority to Napoleon, Captain Hart fails to make his point, largely because he refuses to recognize that, with the exception of Hannibal, Scipio's blows were delivered against men of straw. In Hannibal's phrase, Scipio had "an enemy blind to such arts of war." Brilliant as were his ruses, sound and even profound as was his strategy, the fact remains that Scipio's career is a poor framework on which to hang ultra-modern theories of war, unless one means to choose an enemy of great inferiority, both mentally and morally. Then, indeed, one may ignore his field armies, swoop down and storm his base of operations, massacre the inhabitants, and march back unharmed. Then, indeed, one may threaten his line of communications, force him to battle, and envelop both his flanks while he stands, in superior force, inert; or one may lure him into a narrow valley where he cannot maneuver even if he would, and then crush him by a wide turning movement; or at night one may burn his cantonments and put him to the sword while he flies in terror. The point is, pick your enemy. Then you may employ the most modern (or are they the most ancient) methods of crushing his will-to-win.

As an illustration of Captain Hart's theories on the "mechanicalization" of war and the breaking away from tradition, Scipio's campaigns are not altogether convincing. Of Scipio's insistence on cavalry (artificial mobility plus shock power, from the point of view of the foot-soldier), Hart writes: "It is not the least tribute to his genius that to appreciate this he had to break loose from the fetters of a great tradition, for Rome's military greatness was essentially built on the power of her legionary infantry. The long and splendid annals of Roman history are the testimony to its effectiveness, and only in Scipio's brief passage across the stage do we find a real break with this tradition, a balance between the two arms by which the power of the one for fixing and of the other for decis-

ive maneuver are proportioned and combined. It is an object-lesson to the modern general staffs, shivering on the brink of mechanicalization, fearful of the plunge despite the proved ineffectiveness of the older arms in their present form, for no military tradition has been a tithe so enduring and so resplendent as that of the legion." Aside from the evident superiority of the Roman cavalry to the Carthaginian, one wonders how the failure of the Carthaginian elephants squares with Hart's ideas on artificial mobility and shock power and the advantages of breaking with tradition.

A few of Captain Hart's observations cannot be accepted by Americans for local (perhaps he would say provincial) reasons. As, for instance: "He [Scipio], the servant of a republic, is the one exception to the rule that throughout the history of war the most successful of the great captains have been despots or autocrats." And: "As so often in history, the disappearance of the oppressor was the signal for the dependencies to find the presence of their protector irksome. Mandonius and Andobales [Spanish rebels] were but the forerunners of the American colonists and the modern Egyptians. There is no bond so irksome as that of gratitude."

But with Captain Hart's theory of the use of war, Americans will not disagree. Here he swings back to the orthodox. He comes as near as his prejudice will allow him to subscribing to the Clausewitzian doctrine that war is the continuation of policy. He extols the use which Scipio made of his victories to establish a just and lasting peace: "He [Scipio] followed, but enlarged, the old Roman policy, his purpose not to establish a centralized, a despotic empire, but a confederation with a head, in which Rome should have the political and commercial supremacy, and over which her will should be paramount." To the American soldier, with the traditions of the Civil, Indian, Spanish, and World Wars behind him, Scipio's wise statesmanship after victory is perhaps the most appealing and impressive achievement of his career. "Scipio could administer military beatings at least as effectively and brilliantly as any other of the greater captains, but he saw beyond the beating to its object. His genius revealed to him that peace and war are the two wheels on which the world runs, and he supplied a pole or axle which should link and control the two to insure an onward and coordinated progress. Scipio's claim to eternal fame is that he was the staff, not the whip, of Rome and of the World." But General Sherman put it even more succinctly: "War's legitimate object is more perfect peace."—S. M.

The Two Battles of the Marne. By Marshal Joffre, Crown Prince Wilhelm, Marshal Foch and General von Ludendorff. Cosmopolitan Book Company. 1927. 5½"x 8". 229 pp. \$2.50.

The First Battle of the Marne.—Articles by Marshal Joffre and Crown Prince Wilhelm. These two opposing authorities agree that one of the main German errors which decided the issue of battle was the unwillingness or inability of the German supreme command to control the movements of the German armies. Joffre puts it in this way: The German doctrine "taught that the actual direction of a battle falls principally upon the subordinate commands. The Commander-in-Chief, after having drawn up the general plan of battle, makes way for the initiative of his army commanders." Wilhelm, conceding the facts, denies that they followed German doctrine and maintains that they resulted solely from the weakness of Von Moltke: "The responsibility for the tremendous and staggering tragedy of the

Marne falls directly upon General von Moltke . . . The German supreme command . . . meekly acquiesced when General von Hausen, instead of obeying orders to advance in a southwesterly direction, turned his Third Army eastward . . . [and] thereby utterly relinquished contact with the German right wing. Moltke and his aides were apparently permitting events to shape their own course. How differently his uncle, the great Moltke, would have handled the situation! . . . I maintain . . . that the responsibility for the German front breaking at the center (leaving a wide breach) must be laid at the door of the supreme command." And of Von Kluck's movement to the southeast from the Oise he writes: "If the supreme command had believed this maneuver . . . to be dangerous, it could at any time have saved it." Still more was lack of control shown when Von Kluck, in crossing the Marne, "definitely disobeyed an order issued to him by his superior command."

Joffre and Wilhelm agree, therefore, that a decisive factor in the battle was the lack of control over their armies exercised by the German supreme command, and both condemn the choice of Luxemburg, far to the rear, for the German G. H. Q.

But Joffre maintains that the "most essential" factor in the great French victory was the surprise which resulted from the formation of Maunoury's army on the extreme west and its attack on Von Kluck's exposed flank. Wilhelm concedes the surprise so far as Von Kluck was concerned. "He did not know that the French behind their front were effecting important regroupings and were entraining strong forces for Paris from the French right wing more than 100 miles to the east." But on the other hand Wilhelm strongly intimates that Maunoury's attack did not, or at least should not have surprised the German supreme command. "Moltke was in receipt of messages from headquarters of the Third, Fourth, and Fifth Armies, stating that the enemy was withdrawing units facing them and entraining these units for other parts of the front. . . . Now, what could seem more obvious than that these forces were being transported to Paris to be employed against the German right flank? This danger had been worrying Moltke since September 2." Furthermore he says that "a number" of aviators reported that "enemy forces approximating two and one-half army corps and one and one-half cavalry divisions were concentrated northeast of Paris," though these reports failed to reach Von Kluck.

As to the necessity for the German retreat, which sealed the fate of the battle, Joffre and Wilhelm differ widely. Joffre maintains that "The gap between the First and Second German Armies was held only by a thin line of General von Marwitz's cavalry. While this was being driven back Maunoury was endeavoring to turn Von Kluck's right flank. To avoid the success of this operation, the German supreme command ordered the general retreat." Wilhelm, on the other hand, will have it that "The threatened break through the German front [Von Marwitz's] by the English was successfully warded off. General von Kluck, by the incomparable feat of an encircling movement on the decisive northern wing near Maneuil, had achieved a complete tactical victory over General Maunoury. This was the well-deserved reward for holding unshakenly to a plan, the moral grandeur of which marks its originator as a born leader in the field. . . . General von Kluck . . . persisted along the Marne until the very moment on September

9 when the supreme command ordered a retreat." And this order to retreat Wilhelm ascribes entirely to Von Moltke's weakness, to Lieutenant Colonel Hentsch's "preconceived idea of the necessity for a retreat" when he started on his famous mission to Von Bülow and Von Kluck, and to Hentsch's baneful influence on Von Bülow.

The Second Battle of the Marne.—Marshal Foch and General von Ludendorff write of this battle, though neither confines himself to it, each considering rather the entire campaign of 1918.

The main theme of Foch's article is the struggle for unity of command and the functioning of that command, his premise being that "When, in the spring of 1918, the higher command was finally created and the Allied armies faced the Germans as a single unit, the war was won. The end was only a matter of time." He writes a most interesting sketch of the interplay of forces which finally ended by his being made generalissimo. To Lloyd George he gives the honor of being the first responsible authority who dared openly to urge unified command. But later Lloyd George recanted, under pressure from Haig and Robertson. "As for General Bliss, the American representative, ever since his arrival in France, during November, 1917, he had openly agitated for a single military command." And so the idea grew, until its acceptance was finally forced upon the Allies by the German offensive of March, 1918.

General von Ludendorff supports Foch's thesis by saying that German success would not have been possible in the defensive battles of 1917 "if our enemies' attacks had been coordinated by a single commander," and that in March, 1918, "the leadership of Foch, now in supreme command of the Allied armies, was undoubtedly one, if not the chief, factor that thwarted my intentions."

Of even greater interest is Foch's conception of his functions as generalissimo. "I prefer the expression 'higher management.' . . . Do not imagine that the command, in the military sense of the word, can be exercised over very different armies by the relatively simple means that a general is accustomed to employ in handling his own army. . . . Compulsion . . . will not insure the carrying out of orders in armies of different nations. . . . The higher management . . . must pursue one objective—it must elevate the morale and increase the strength of each army while coordinating the efforts of all. . . . Then, too, there must be *understanding* at any price. Communications must be frank and clear. . . . The main thing is to make the coalition work. . . . Victory! That is the end. Every means is good as long as it leads quickly to this. The whole problem is when and how to employ all the resources at one's disposal."

For the Americans, Foch has only the highest praise. "What a noble gesture! What an admirable impulse!" he writes of Pershing's offer of his forces during the March offensive. Of Saint Mihiel he says: "For a first attempt of a 'new' army, it was a masterly achievement. The moral effect was incalculable. . . . In the crucible of an independent action the American Army had proved itself." When he comes to the final Allied attack he writes: "The Argonne was the pivot of the entire front . . . It was the Achilles' heel of the German Army. . . . This great offensive of the Meuse-Argonne is, I believe, by far the greatest battle in American military history. Certainly none is more glorious."

General von Ludendorff's article compares most unfavorably with Foch's. It is full of recriminations and crotchety complaints. He is clearly under the impression that he almost won the war in spite of "Germany's weak and clumsy political ad-

ministration," in spite of the vacillation of the German Admiralty, in spite of the Austrian Emperor ["a weakling, completely under the influence of his wife whose sympathies were all with our enemies"], and in spite of a certain "policy already inaugurated before the outbreak of the war by interests beyond the control of any government—interests whose influence veritably overshadowed the power of the nation"—whatever that may have been.

Concerning our attitude in early 1917 he querulously writes: "Unrestricted U-boat warfare would have been renounced altogether if it had been possible to obtain the guarantee that the United States would remain out of the war. But no such guarantee could be obtained. Our delay was fatal. If the submarine war had been pressed with all our energy and resources, America would not have had time to enter the war before it was won. President Wilson would undoubtedly have refused to enter the war when victory was crowning the Central Powers."

Of our troops Von Ludendorff writes: "The tremendous superabundance of pent-up, untapped nervous energy which America's troops brought into the fray more than balanced the weakness of their allies, who were utterly exhausted. It was assuredly the Americans who bore the heaviest brunt of the fighting on the whole battle front during the last few months of the war. The German field army found them much more aggressive in attack than either the English or the French."

The book as a whole should be of great interest to all military men.—S. M.

Napoleon and His Family. By Walter Geer. Brentano's, New York. 1927. 6¼" x 9¼". 353 pp. Ill. \$5.00.

Under the American creed that "all men are born equal"—meaning that they are born to equal opportunity, family loyalty has ceased to be a virtue. Each member of a family goes his own way, and such success as he may attain is his own. One may feel affection for the members of the family and may assist them through periods of adversity, but one does not consider it incumbent upon himself to have them participate in his success. One does not, when he becomes the head of a business, fill all the best positions with his brothers and his sisters, his brothers-in-law, and his cousins. To do so would, in the American business world, be an invitation to disaster, unless these relatives possessed greater ability than other available individuals, and even in such a case the foundations of the organization might be weakened by the appearance of favoritism.

No Western European can ever quite grasp the American attitude toward family. In Europe the whole social structure is built upon the family group. The strength of the individual is derived from the strength of his family; his station in life is determined by his family connections. Family unity is all-important, and the prosperity of one means the prosperity of all.

This sense of loyalty to the family—particularly intense in the Corsican—was the greatest handicap under which Napoleon suffered in his remarkable career. As he rose to power he carried his relatives with him, and he probably never realized until too late how far he had outgrown them. Napoleon's greatest mistake was his creation of a nobility in which his brothers and sisters had to share. Family jealousies, bickering, and discord made his life difficult, but through it all he remained apparently blind to the ingratitude and incapacity of the members of his family. In the end, his loyalty to his family was probably the most important single factor leading to his downfall.

Walter Geer, who has written a number of Napoleonic books, now makes a detailed study of the influence the family had upon his career. The present volume

—the first of a set of three—brings the uncle (Fesch), the brothers and sisters and their consorts, and Josephine and her family under the microscope, and exposes their actions, their lives, and their capacities up to the time of Napoleon's return to Paris from Spain in 1809. The second volume will carry the story of the family to Moscow, and the third to St. Helena.

One cannot deny that the family played an important part in Napoleon's career, but one may question the need of devoting three volumes to individuals who scarce deserve a place in history. Elisa, who more nearly than all the others approached Napoleon in executive and administrative ability, Lucien, whose devotion to his wife prevented him from healing the breach with his famous brother, and Murat, in his capacity as a cavalry leader rather than as the Emperor's brother-in-law, are worthy of study as individuals who could have been of much greater assistance to Napoleon had they been handled differently. But Joseph, incapable and resentful that he was not in fact the head of the family, Louis, sullen and suspicious, Jerome, irresponsible and disobedient, Caroline, hypocritical and self-seeking, and Pauline, beautiful and indifferent, failed to justify themselves as subjects worthy of study.

As a matter of interest, the book is worth while. Well written—as is all of Mr. Geer's work—it holds the attention throughout. Napoleon necessarily dominates the story, but only so much of his career is included as is necessary to show the influence of the family thereon. Whether or not we are willing to admit that the family justifies the space Mr. Geer gives it, we must admit that the book is most readable—and that, after all, seems to be the important thing these days.

The Remaking of Modern Armies. By Captain B. H. Liddell Hart. John Murray. 1927. 5½"x 8½". 315 pp. Ill. 10 s 6 d.

To Captain Hart's way of thinking almost everything in the military world, from the principles of war to platoon drill, needs "remaking": and by that term he does not imply a slow transformation. Revolution and not evolution is the remedy he suggests. Nor is he content to expose the Napoleonic and other "fallacies," but goes still farther afield and devotes chapters to the origins of the tank, to rival theories of disarmament, and to a recent tour of the battlefields of Picardy. The task of reviewing this book is rather confusing, to say the least.

His ideas, whether acceptable or not, are stimulating and quite ably presented. Mobility and surprise, and their direct application to the hostile morale, appear in this book, as in his *Paris* and *Scipio*, as his guiding light. As a premise he sums up an old theory by saying that: "Mobility has yielded to stagnation whenever the means of defense have acquired a material preponderance over the means of offense." He believes that the balance has now swung the other way, and that the airplane, the tractor and gas, if we but learn to use them, will restore mobility and surprise to war.

But, he thinks, we must first completely revolutionize the infantry; "An arm which is a debit rather than an asset on the balance-sheet of battle. Infantry can no longer conquer a position defended by machine guns. They do not even hold it when conquered." For infantry he would substitute men mounted in one-man or two-men "tankettes" and armed with light machine guns—modern knights in armor, "mobile armored machine gun nests." He describes the construction and characteristics of these tankettes, and thinks that approximately two tankette battalions

could be equipped and maintained for what is now spent on three infantry battalions. It is interesting to note that these tankettes are capable of being landed over a ramp, under their own power, from "an ordinary small naval launch."

Likewise, cavalry, as we know it, he thinks should disappear. The tank should replace the horseman. "Tanks are not an extra arm, or a substitute for infantry, but the modernized form of heavy cavalry"—the mobile shock-power which gives the *coup de grâce*.

Gas of course he favors, and has a short chapter on its efficiency and "humanity." Later on he adds: "The introduction of chemical warfare not only impairs the value of armed forces, based on rifle and gun strength, but promises to bestow military supremacy on the great industrial nations, the nations who devote their peace-time energy to the expansion of industry rather than to the expansion of armies."

In his chapter on "The Napoleonic Fallacy," he repeats the radical ideas of his *Paris* in attacking the principle of the objective—which, incidentally, he maintains is not a principle at all. For the main forces of the enemy he would have us substitute, as primary war objective, the hostile morale. And he would attack that morale by using air force against the civilian population and tanks against the command and communication centers of the military. The historical examples on which he builds up this theory will not stand too close scrutiny. But later on in the book he states his theorem in this way: "The most progressive military thought, following in the footsteps of the Great Captains, conceives the real target in war to be the mind of the enemy command, not the bodies of his troops." So stated, the question really resolves itself into a matter of opinion as to whether it is possible to subdue a hostile will-to-win without forcing or even permitting the enemy to throw his main strength into the scale of battle. No soldier is likely to question Hart's statement that "Battle is at least but a means, a move on the chessboard of war, which is most fruitful when combined, as by Scipio, with moral and economic moves, so that each reacts on the others."

When he comes to leadership he emphasizes the effect of the rut, the difficulty of making changes in a well-established order of things, the narrowing effect of military routine on the mind. To drive home his point he takes fifteen of "the most famous commanders in history" and finds: "First, as regards age, that five had demonstrated their mastery of war before they were thirty, and six more before they had reached forty years of age. The powers of three of the greatest had definitely decayed long before they were fifty, while only two held active command when over the age of sixty. Secondly, as regards the value of professional experience, only four out of the fifteen had served any considerable duration of apprenticeship, whilst only one could truly be said to have suffered the sterilizing influence of routine soldiering in time of peace, and even in Lee's case there had been breaks. Thirdly, touching the question of amateur *vs.* professional, we find that no less than nine were really amateurs who took to a military career either as a means to greater power or for the sake of their country. Of these, Caesar and Cromwell were complete amateurs who had passed forty before they even dabbled in the profession of arms." The moral he draws from this is that the professional soldier should be chary of disparaging the amateur, and that

originality should be encouraged in professional armies, even through favoritism. "The effort to make the Army fairer as a profession is contrary to the very nature of its object—war, which is essentially unfair." And he quotes with approval Admiral Fisher's dictum that: "Favoritism is the secret of efficiency."

His chapters on "Post-War Doctrines" and "The French Army Today," in which he compares the modern British, French, and German doctrines, are perhaps the most interesting in the book. "Mobility, maneuver, and surprise are the keynotes of the German doctrine. . . . In contrast, the French regulations are absorbed above all with the dominance and development of fire-power, while our [British] 'Field Service Regulations' blend both aspects so subtly, perhaps too subtly, that not one of these lessons is impressed deeply on the reader's mind."

In summing up his comparisons he writes: "It is felt that the French are unduly influenced by the lessons and conditions of 1914-1918 on the Western Front, with its closed flanks, unwieldy numbers, and enormous armaments, while the German horizon is widened by a well-balanced appreciation of the experience on their Eastern and South-Eastern Fronts, and ours by the knowledge of the varying theaters which are rendered possible by our Imperial problems. . . . It is paradoxical that the French and Germans should have exchanged doctrines, in essence at least, the Germans embodying the Napoleonic traditions of mobility and surprise, while the French forsake their historic élan and swift maneuvers in their devotion to fire-power."—S. M.

History of the 308th Infantry, 1917-1919. By L. Wardlaw Miles. G. P. Putnam's Sons, New York. 1927. 6"x 9". 357 pp. Ill. \$6.00.

In selecting Captain Miles to prepare the regimental history, the 308th Infantry chose well: first, because in civil life he is entirely at home in the field of letters, and second, because his war record justifies the honor. Few had a more distinguished career at the front, and his outstanding abilities as a soldier were recognized by an imposing array of decorations, including the Congressional Medal of Honor, the French Légion d'Honneur (chevalier), the French Croix de Guerre with Palm, the Italian Croce di Guerra, and the Montenegrin Ordre du Prince Danilo I.

The 77th Division was among the first of the National Army divisions to reach the front. It saw considerable service and it had its fair share of easy going and of hard going—this latter in the Argonne forest in particular. While it may not have attained quite the distinction of some of the older divisions, it can look back upon its record with a great deal of pride and with few regrets.

The 308th Infantry saw some hard fighting and fully earned all the decorations it received. Its most notable exploit was the incident of the "Lost Battalion"—the account of which is written by its commander, Lieutenant Colonel Charles W. Whittlesey, in collaboration with Major Charles W. McMurtry, second in command.

The book is well written, but it lacks proportion—a fault which the author explains by the variable amount of material available. He chose rather to give an apparent emphasis to some of the minor actions than to omit material merely to preserve proportion, and in this he was, of course, justified. The author errs

in believing that the units of the 77th Division were "the first Americans to pass through England in considerable numbers," for many had passed through before April, 1918.

The illustrations are numerous and interesting, but there are no maps of suitable scale to show just what the regiment accomplished, nor is there an index. However, it is well that the record of the regiment has been published, and it is to be hoped that other regiments having front-line service will bring forth their records.

Gasoline Automobiles. By James A. Moyer. McGraw-Hill Book Company, Inc., New York. 1926. 4¾" x 7½". 352 pp. Ill. \$2.50.

This is the second edition (the first edition was published in 1921) of an authoritative work on the modern automobile. The author has added in this edition additional material on the sleeve valve engine, high compression fuels, and steam cooling.

The automotive industry is a dynamic one. Competition is keen, perhaps keener, than in any other. Improvements and refinements are often made as "selling points" to be tried out by the purchaser rather than await the results of engineering tests. Mr. Moyer discusses rather the many phases of automotive design in a pleasing way, avoiding mathematics and too great attention to detail.

The chapters dealing with engine timing and ignition are particularly good and of value to any man wanting to know something of what goes on under the hood of his car. The book can be read with profit by any student in military motor transportation.

The Arcturus Adventure. By William Beebe. Putman's Sons. 1926. 439 pp. Ill. \$6.00.

What can one make of a failure? Apparently, if one is a William Beebe (and is assisted by a Ruth Rose), one can make quite a lot of it. One may, for instance, sally forth to explore the Sargasso Sea and the Humboldt Current, find neither the one nor the other, and come home and write a delectable book about the incredible life of the deep sea; strange, tireless birds; pirate islands; submerged cañons and waterfalls far more magnificent than Yosemite or Niagara.

But you have got to be a Beebe to do it—and Beebes are rare. The scientist with the gifts of enthusiasm and of the pen who can make you see the things he draws up from the bottom of the sea and the equally strange forms which pass before his copper helmet in thirty feet of tropical water—who can make you see all this in actuality, as though you were there—is a man worth while. And if you want a book in which an unknown world passes, living, before your eyes, a book whose vivid descriptions are etched in with keenness and humor, read this one.—S. M.

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